Manufacturers Record

BIRMINGHAM, ALABAMA

A modern city of the South, this steel and iron center is outstanding proof of the possibilities for new wealth creation at the site of abundant natural resources.

Birmingham has led the United States throughout the depression in its percentage of steel production in relation to capacity. The remarkable growth of this industrial metropolis in but little more than fifty years is due to the accomplishment of private initiative.

Investment money and industrial management find in the Southern states unequalled conditions for profitable enterprise.

The South is the nation's greatest asset.

APRIL
1940

National Biscuit Company's new plant, Atlanta, Ga., for which 3550 tons of steelwork was shipped complete by Virginia Bridge three months from receipt of order. Geo. A. Fuller Co., Genl. Contr., Louis Wirsching, Jr., New York City, Designing & supervising architect.

UNDER THE BIG TOP of

a modern baking plant. Nearly 9-acres of ground space under one roof gives an idea of the enormous spread of this huge bakery.

A high percentage of the large industrial plants of the South are built with Virginia Bridge fabricated steel. Three adequately equipped plants strategically located to serve every part of the South and Southwest, a thoroughly experienced engineering, fabricating and erecting organization capable of handling structural steel jobs of any size or type, affords the construction industry of the South and Southwest unexcelled steel fabricating and erecting service.

Virginia Bridge

STEEL STRUCTURES

ALL KINDS

VIRGINIA BRIDGE COMPANY

Roanoke Birmingham Memphis

Atlanta New York Dallas

A NEW INDUSTRIAL EMPIRE

SOUTH'S MANUFACTURES EXCEED ELEVEN BILLIONS A YEAR— 2½ TIMES ITS AGRICULTURAL OUTPUT

As the Life of a nation is measured, 75 years is but a short time. During that period since Appomattox, victories have been won in the South greater than any on the battlefield; the construction of railroads, the opening of mines, the building of furnaces and factories, increased employment, the change of the South from largely an agrarian area to the point where it is now one of the most important manufacturing centers of the nation.

IF YOU WOULD like to know more about the South of today, its marvelous resources, its industrial opportunities, present markets and current activities, our 16 page booklet describing

"THE SOUTH'S RESOURCES"

will be mailed to industrial executives upon request.

All regular readers of the MANUFACTURERS RECORD will receive "THE SOUTH'S RESOURCES" as part of their subscription.

Rates: $2.00 for one year; $3.00 for two years

MANUFACTURERS RECORD

BALTIMORE, MARYLAND

Elevated Tanks Provide Uniform Gravity Water Pressure

Winston-Salem, North Carolina is one of the typical Southern cities that has taken full advantage of elevated water tanks to provide gravity water pressure. In addition to the 1,000,000-gal. radial-cone tank shown above, the city installed a 50,000-gal. ellipsoidal-bottom unit in the southeast section of the city and a 200,000-gal. radial-cone tank in the northern section of the system.

The 1,000,000-gal. tank is 87½ ft. to bottom and has a range in head of only 25 ft. The two outlying tanks are 127 ft. and 101½ ft. to bottom respectively, so as to regulate the pressure in the system. The three new elevated tanks at strategic locations have eliminated the extreme variations in pressure previously experienced. They also equalize the difference between the demand and the pumping rate, eliminating the necessity of operating additional pumps to meet peak demands.

CHICAGO BRIDGE & IRON COMPANY

Birmingham .....1530 North Fiftieth Street
Dallas .....1408 Liberty Bank Bldg.
Houston .....2919 Main Street
Tulsa .....1611 Hunt Bldg.
New York .....3313-165 Broadway Bldg.
Cleveland .....2216 Rockefeller Bldg.
Chicago .....2106 Old Colony Bldg.
San Francisco .....1040 Rialto Bldg.
Philadelphia .....1619-1700 Walnut Street Bldg.
Detroit .....1510 Lafayette Bldg.
Boston .....1510 Consolidated Gas Bldg.
Havana .....Edificio Abreu 402

B-718

Plants in BIRMINGHAM, CHICAGO and GREENVILLE, PA.

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MANUFACTURERS RECORD

Devoted to the Upbuilding of the Nation Through the Development of the South and Southwest as the Nation's Greatest Material Asset

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Member A.B.C.

Entered as second class matter at the postoffice, Baltimore, Md., U.S.A., under act of March 3, 1879. Volume 109, Number 4 Monthly

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COMPRESSORS
Compact
Efficient
Reliable
Durable
Here is one of the many types and sizes
Type "Y" Compressor
Two-cylinder, two-stage, air-cooled, for continuous operation against 200 lbs. pressure, sizes 3.6 to 41 cu. ft. Controlled combined pressure and splash lubrication. Unloader interlocked with lubricating system to prevent delivery of air when oil supply is depleted. Low power cost. Motors for any commercial circuit. Mounted complete on tank as shown, or on bed plate for sill installation. Catalog 2051. Write for prices.
Westinghouse
AIR BRAKE CO.
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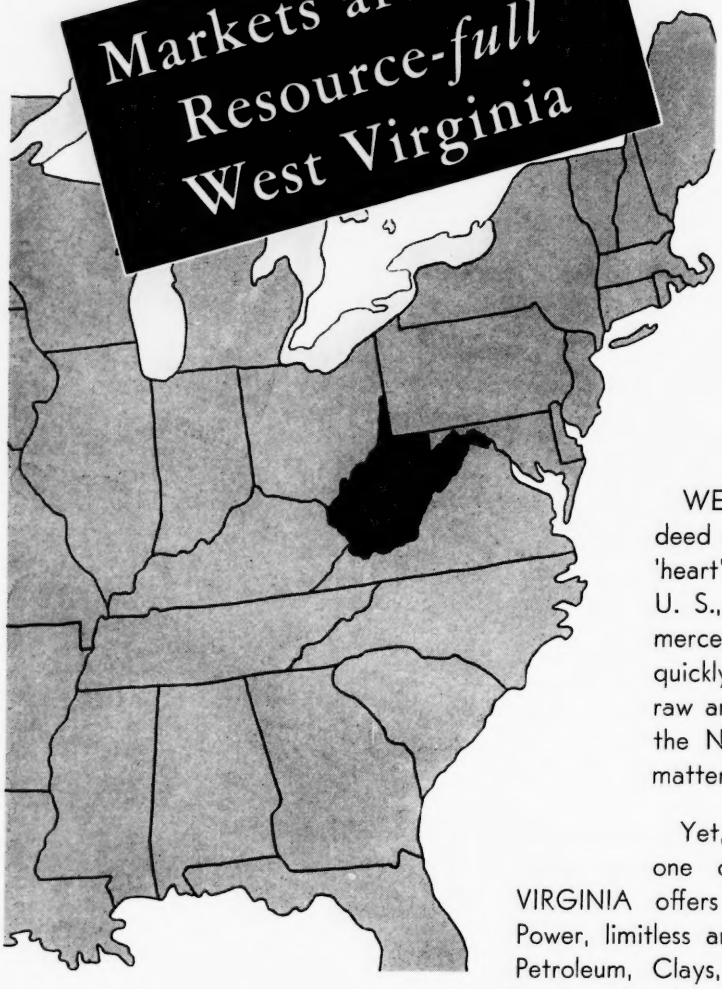
Markets are Near Resource-*full* West Virginia



WEST VIRGINIA'S location is indeed unique! Literally a geographic 'heart' for half the population of the U. S., its adequate avenues of commerce—rail, water, highway and air—quickly transport WEST VIRGINIA'S raw and finished products to most of the Nation's important markets in a matter of hours.

Yet, geographical location is but one of many advantages WEST VIRGINIA offers Industry! Ample Labor and Power, limitless and superior Coal, Natural Gas, Petroleum, Clays, Salt Brines, Limestone, Silica Sand and other mineral resources, cooperative Private and Public organizations — all these and more await Industries seeking a stable manufacturing region.

Write today for further information on this remarkably endowed State. Details will be gladly furnished by: Industrial Development Committee, State Capitol, Charleston, W. Va.

Look to West Virginia First!

West Virginia Publicity Commission

» » » LETTERS « « « AND COMMENTS

Still Opportunities for Rayon Expansion

CHATTANOOGA CHAMBER OF COMMERCE
Chattanooga, Tennessee

Editor, MANUFACTURERS RECORD:

I have before me the March issue of MANUFACTURERS RECORD and have noticed as usual that you carry some very interesting information concerning the development and growth of the South. I was particularly interested in the double page spread concerning rayon plants, and I feel there are still splendid opportunities for further development of this business in this particular territory.

P. E. SHACKLETT, Industrial Director.

Resource Maps

TENNESSEE COAL, IRON AND RAILROAD COMPANY
Birmingham, Ala.

Editor, MANUFACTURERS RECORD:

I thought so well of your maps and your write-ups on each particular state in the South that I had my secretary cut these from each one of your issues and I keep them in a folder, for they are very valuable as reference matter.

KARL LANDGREBE, Vice-President.

The maps referred to by Mr. Landgrebe will be brought up to date and republished in "The South's Resources" issue of the MANUFACTURERS RECORD, *which will also contain additional information regarding the great number of industrial opportunities, commercially available raw materials, and developed facilities for industry in the 16 Southern states.* Ed.

Masonite Experiments With Australian Pine

UNIVERSITY OF TAMPA
Tampa, Florida

Editor, MANUFACTURERS RECORD:

Please let me thank you for the reprints of the article "Pulp Man's Paradise" which you so kindly sent me this month. To date over 20 copies have been distributed to interested parties.

I might add that the Masonite Corporation of Laurel, Mississippi, manufacturers of Wall Board have become interested in the possibilities of using Australian Pine in their product to the extent of planting 1000 seedlings and securing from the University of Tampa a 500 pound sample of the green wood for experimental purposes at their Laurel plant.

DONALD D. BODÉ, Professor of Chemistry.

The article, "Pulp Man's Paradise," appeared in the January issue of MANUFACTURERS RECORD. *A limited supply of reprints are available at 10¢ a copy.* Ed.

Commendation

M. DWIGHT BELL, CONSULTING ENGINEER
Minneapolis, Minn.

Editor, MANUFACTURERS RECORD:

Recent articles which aroused special attention included "Incorporated Bureaucracy" by Senator Byrd of Virginia; "Wanted—a business pilot" by Dr. John J. Wicker and "The Permanence of Southern Pulp Mills," by Prof. A. E. Wackerman.

My interest has been especially in paper mills. I know the manager of the new mill at Lufkin, Texas, Mr. Thos. Wark, and some day I hope to see this new plant and know more about how this development will work out, in competition with our Northern paper mills, and those in Canada.

M. DWIGHT BELL.

CRAINE, INC.
Norwich, N. Y.

Editor, MANUFACTURERS RECORD:

Our District Agent, Mr. A. L. Weaver, has very kindly for-

(*Continued on page 9*)

with Cheap Water & Fuel Power, Raw Materials, Transportation and 16 Million Consumers

Manufacturers of practically any line of merchandise may profitably consider the establishment of plants in this enormously rich and fast-growing area—served by Frisco First. An investigation will enable them to predetermine, definitely and accurately, production and market potentials under the most favorable and agreeable labor conditions.

This fact is demonstrated by several thousand manufacturers who, in only the past few years, have established plants, with a capital investment of $100,000,000 within the Friscobelt.

Industries depending upon agriculture will find, in the Friscobelt, ideal soil and climatic conditions for the production of needful commodities.

For prompt and complete information, address—

Industrial Department, Frisco Lines,
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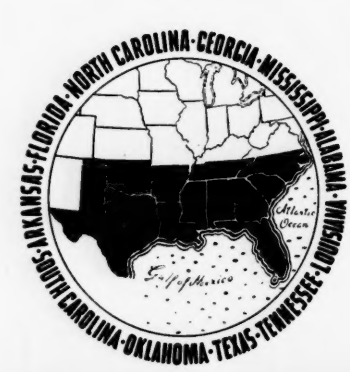
SOUTH CAROLINA · OKLAHOMA · TEXAS · TENNESSEE · LOUISIANA · ARKANSAS · FLORIDA · NORTH CAROLINA · GEORGIA · MISSISSIPPI · ALABAMA
Atlantic Ocean
Gulf of Mexico

THE SOUTH

INVITES YOU TO TAKE PART IN ITS INDUSTRIAL GROWTH

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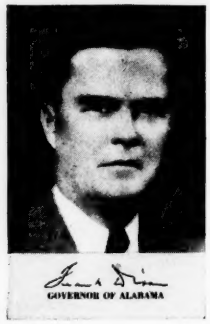

GOVERNOR OF ALABAMA

GOVERNOR OF GEORGIA
Chairman

WE, THE GOVERNORS . . .

■ ■ invite Industrialists to consider the South's natural advantages, which are the base for the amazing industrial expansion of this section.

In two years the value of the South's manufactured products has increased approximately 35 per cent, and is now two and a half times the value of its agricultural output.

During the same period the number of manufacturing plants in the South increased by 803 as contrasted to a decline in the rest of the United States of 3120.

The South now produces practically all of the naval stores, sulphur, carbon black, Fuller's Earth and phosphate rock of the country, and over half the bituminous coal, natural gas and crude petroleum, as well as a material part of a long list of other important minerals necessary to industry.

With natural resources unmatched in any other part of the country, a favorable climate, excellent transportation and power facilities, with strategically located ports for foreign trade, the South represents THE NATION'S ECONOMIC OPPORTUNITY NO. 1.

Southern Governors' Conference

Bona Allen Building, Atlanta, Georgia

LAWRENCE WOOD ROBERT, JR., Executive Director

CARROLL DOWNES, Industrial Consultant

"Letters and Comments"

(*Continued from page 7*)

warded the article "Is it a Crime to Have a Dollar?" as reprinted from the MANUFACTURERS RECORD.

There are numerous expressions in this article which certainly hit the nail right on the head but the one that has always stayed by the writer and which he can subscribe to 100% is the expression "The only thing that keeps a man's face clean is his own sweat."

If you can get over to the masses, the significance of this one expression, 90% of the problems that are vexing industry as well as the government at this time will be automatically eliminated.

H. D. PALMITER, Sales Manager.

HARRY STRODTBECK, CONTRACTOR
Mt. Vernon, Ohio

Editor, MANUFACTURERS RECORD:

I am pleased to enclose my check for renewal of MANUFACTURERS RECORD and in doing so wish to commend you on your editorial policy in particular as to your comments on certain activities of the New Deal.

I believe you are doing a lot of good and I look forward to your issues with much interest.

HARRY STRODTBECK.

CELANESE CORPORATION OF AMERICA
New York, N. Y.

Editor, MANUFACTURERS RECORD:

Would you be good enough to send two extra copies of the March number of the MANUFACTURERS RECORD to me at this office.

I want to compliment you on the excellent article on the Rayon and also on the other contents of your publication.

A. SCHWARTZ.

The letters from Readers Bell, Palmiter, Strodtbeck and Schwartz are deeply appreciated. Comments and suggestions about our work—particularly about subjects our readers would like to see covered—are always welcome. Ed.

Dallas Industrial Growth

Two major industrial plants, which will represent total initial investments of $1,400,000, will be started in Dallas during 1940, officials of two firms announced recently.

Procter and Gamble Manufacturing Co. will build a $1,000,000 soap manufacturing plant in Dallas, which will give employment to 200 workers. The factory will be constructed on a 50-acre tract of land on South Lamar Street, which the company has owned for a number of years, and on which is also located the Procter and Gamble oil and shortening plant built in 1921. The oil and shortening plant already employs 160 workers. The Procter and Gamble soap plant will be virtually a duplicate of a plant which the firm is now completing at Quincy, Mass., near Boston.

All of the Southwest will be served from Procter and Gamble's new soap plant in Dallas. It will be the fifteenth soap plant which Procter and Gamble has built or acquired in the United States and Canada since the firm began business in 1837. Construction on the $1,000,000 factory is expected to get underway by early summer.

Standard Brands, Inc. has announced plans for a $400,000 Fleischmann's yeast plant, to be constructed later this year on a four-acre site adjoining the recently completed Dallas plant of Canada Dry Ginger Ale, Inc.

The big yeast plant will make Dallas an important manufacturing-distributing center for Standard Brands. A big coffee roasting plant and regional offices and warehouse facilities, serving the Southwest, have been located in Dallas for a number of years. In December, Standard Brands moved national headquarters of its Widlar pickle division from Cleveland to Dallas. And early in February, Bowman and Co., egg division of Standard Brands, opened an egg-breaking plant in the third unit of the Santa Fe Building in Dallas.

They've done it again!

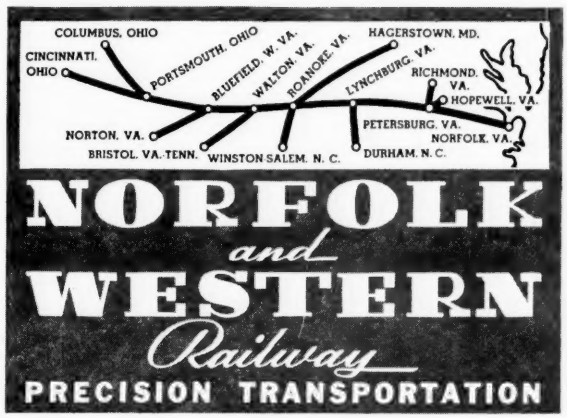
The best accident prevention and safety record in the history of the Norfolk and Western Railway is the great achievement of N. & W. employees in 1939.

The 1939 employee record is three per cent better than that of 1938, for which the Norfolk and Western was awarded the coveted Harriman Memorial Gold Medal . . . is 90 per cent better than that of 1912, when the Norfolk and Western inaugurated the SAFETY MOVEMENT . . . and is 43 per cent better than the average for all railroads of the country!

That's progress! . . . progress in safety that means this railroad in 1938 and 1939 alone carried a total of 2,286,000 passengers nearly 169,000,000 miles without a single injury or fatality in a train accident . . . progress which has resulted in the actual saving of 904 employees' lives and the prevention of 32,828 employee injuries since 1912.

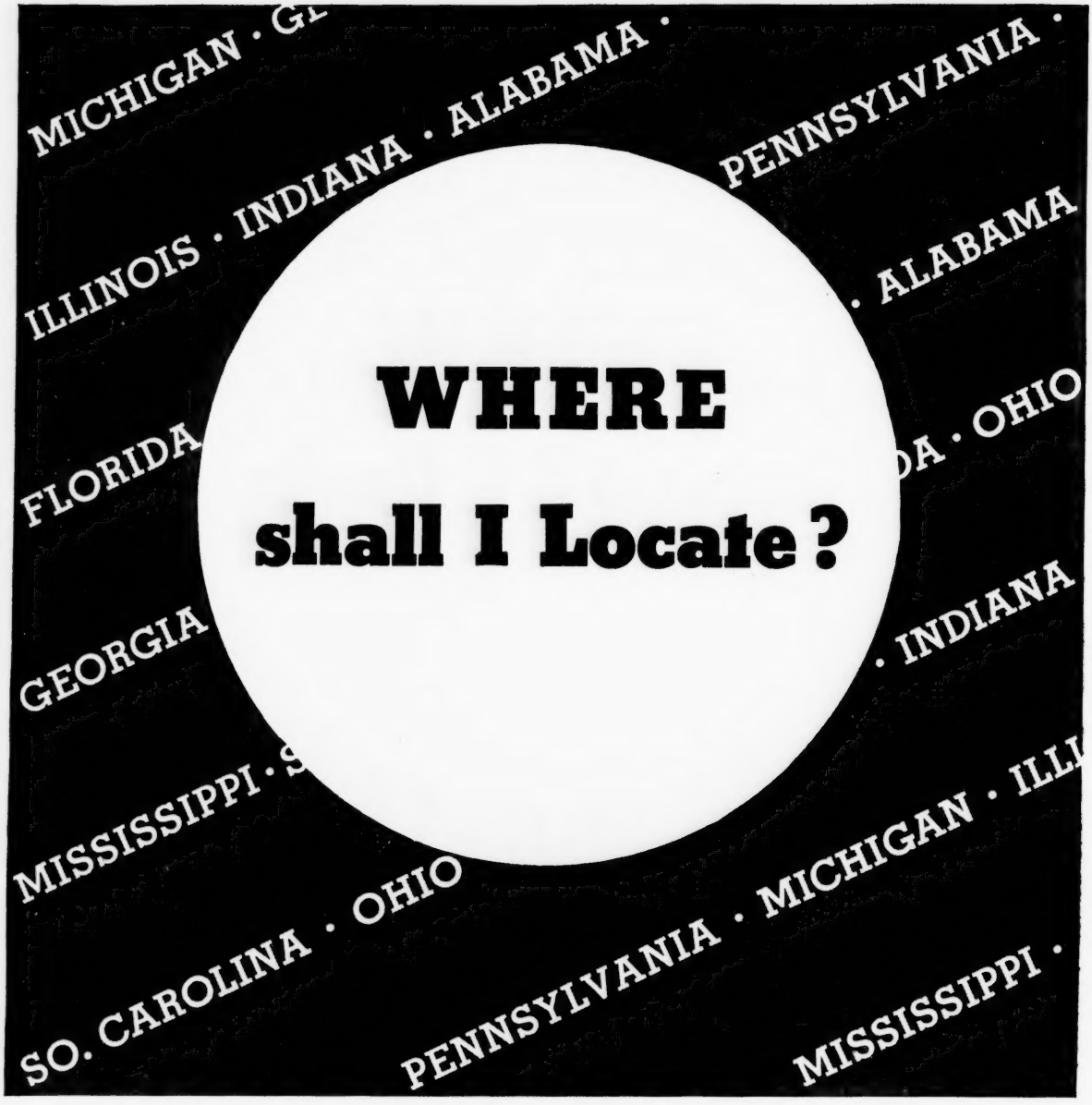
The Norfolk and Western's safety achievements are the result of years of practical planning, the expenditure of millions of dollars for improvements to equipment and facilities — and above all, the efforts of the railway's employees themselves.

The Norfolk and Western Railway's progress in safety means a safer railroad on which to work, a safer railroad on which to travel, and a safer and more efficient transportation system for the shipper and receiver of freight.



NORFOLK and WESTERN Railway

PRECISION TRANSPORTATION



● We maintain a trained organization to help industries find the most desirable sites for branch plants or new plants.

We have maintained such an organization for years. During this time, we have assisted hundreds of companies in various lines and have become familiar with the special requirements of many lines of business.

Naturally it is to our interest to bring industries to the communities using our electric and gas service. If, however, we find no advantage for you anywhere in the territory served by our operating companies, we will tell you so, frankly.

Fortunately, we serve an area which is one of the richest in the country in industrial opportunities. Extending from the Great Lakes to the Gulf, there are here abundant and readily accessible sources of raw materials, desirable labor, dependable power and quick, direct transportation to densely populated consuming areas.

If you have under consideration any matters involving branch plant development or corrective relocation, this organization's services are at your disposal.

Your survey will be made in *strict confidence and without cost or obligation to you.* Address: Industrial Development Department, The Commonwealth & Southern Corporation, 20 Pine Street, New York City.

THE Commonwealth & Southern CORPORATION

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TO GET GREATER LIFE

FROM YOUR LUMBER

THE WOOD PRESERVING CORPORATION
701 Koppers Building, Pittsburgh, Pa.

Please send me the following product information:

- ☐ Pressure-treated Highway Posts
- ☐ Typical Highway Bridges
- ☐ How to Measure Quality of Penetration
- ☐ Prevention of Termite Damage
- ☐ Painting of Creosoted Wood
- ☐ Laminex Laminated Pre-fabricated Culverts

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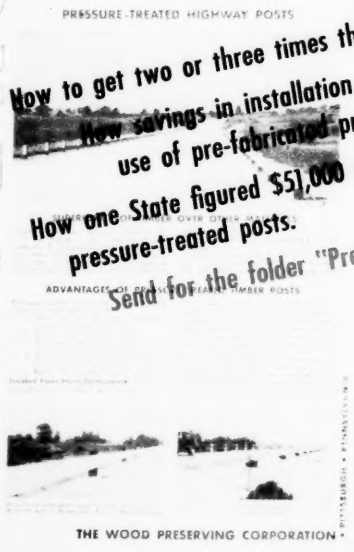

How to get two or three times the life from highway posts.

How savings in installation costs can be realized through the use of pre-fabricated pressure-treated posts.

How one State figured $5[illegible],000 of savings annually by using pressure-treated posts.

Send for the folder "Pressure-treated Highway Posts."

How you can prevent termite damage to new buildings.

What you can do after termites invade a building.

Send for the folder "Prevention of Termite Damage."

KOPPERS

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SOUTHERN YELLOW PINE POLES
SOUTHERN YELLOW PINE PILES
DETERMINATION OF PENETRATION
PENNSYLVANIA

How you can tell whether you get properly treated timber.

How to make the approved tests of pressure-treated timber.

Send for the folder "How to Measure the Quality of Pressure Treatments."

KOPPERS

How to cut the first cost of your permanent bridge construction.

How to reduce bridge maintenance.

What your co[illegible] on different types of bridges.

Send for the folder "Typical Highway Bridges of Pressure treated Timber."

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KOPPERS subsidiary

R. L. LAWRENCE, Jr.

(Superintendent and Chief Engineer, Water Works Department, Nashville, Tennessee)

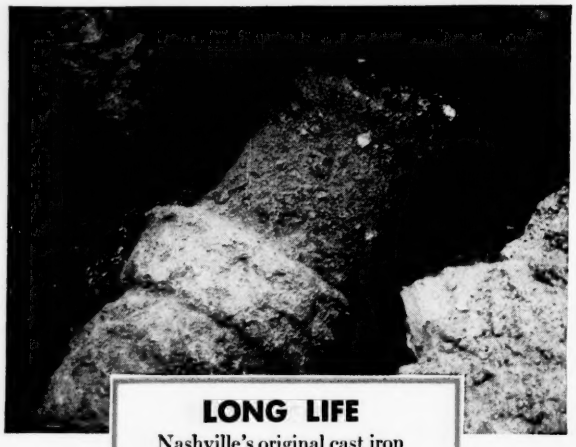
writes:

"Although we have cast iron pipe in our system over 100 years of age, the only photographs available are of 24-inch pipe laid 59 years ago in the congested uptown section of the City. Several hundred feet of this line, which traversed the site of our new City-County Building, was recently removed and, being in excellent condition, will ultimately be placed back in service elsewhere. The maintenance cost per mile of this old line has been approximately $5.44 per year."

R. L. Lawrence Jr.

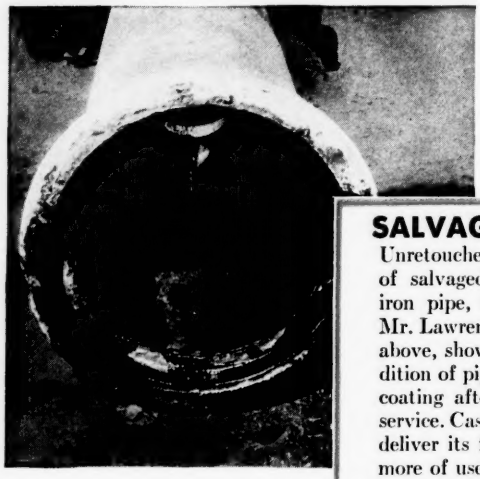
LOW MAINTENANCE

is an economy feature of cast iron pipe that is proved by water works records the nation over. An impartial survey among 195 water works superintendents shows that the maintenance cost of cast iron pipe is far below that of any other pipe material which has been in use long enough for the recording of conclusive data.



LONG LIFE

Nashville's original cast iron water main, still in service, was laid one year after New York's 109 year-old cast iron main, shown in the accompanying unretouched photograph. Many millions in tax dollars have been saved by the long life, low maintenance cost and salvage value of cast iron pipe.



SALVAGE VALUE

Unretouched photograph of salvaged 24-inch cast iron pipe, referred to in Mr. Lawrence's statement above, showing good condition of pipe and interior coating after 59 years of service. Cast iron pipe will deliver its full century or more of useful life, in one location or another, as changed conditions may require.

Water mains represent about one-third of this country's 5-billion-dollar investment in public water supply systems. More than 98% of these mains are cast iron pipe with a *known* useful life at least double the *estimated* life of other water main materials. Because the tax-saving, through avoiding replacements, is enormous, cast iron pipe is known as Public Tax Saver No. 1.

CAST Q IRON

Look for the "Q-Check" Registered trade mark. Cast iron pipe is made in diameters from 1¼ to 84 inches.

THE CAST IRON PIPE RESEARCH ASSOCIATION, THOMAS F. WOLFE, RESEARCH ENGINEER, 1015 PEOPLES GAS BUILDING, CHICAGO, ILLINOIS

CAST IRON PIPE

PUBLIC TAX SAVER NO. 1

The Case of the DEADLY THIRST

SOLVED WITH PREVENTIVE MAINTENANCE

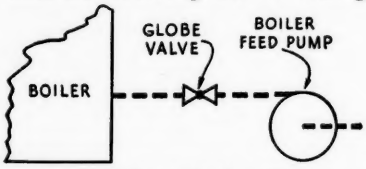
"Killing that boiler will cost us real money," shouted the SUPERINTENDENT. "We can't keep up with orders now!"

"It might have been lots worse," sighed the PLANT ENGINEER," . . . if we hadn't located the trouble in time."

"But, it won't happen again," said the CRANE MAN," . . . now that you've applied Preventive Maintenance with the right Crane valve."

THE machinery in a manufacturing plant was humming gaily to the tune of big orders. But one day the hum quieted. One of the high pressure boilers had to be "killed." A valve in the feed water line jammed; the fire had to be pulled or the thirsty boiler would burst.

The valve was a gate with rising stem and solid wedge disc. Throttling



service and the pulsating flow from the feed water pump were more than it could stand. Vibration of the disc cut the stem in two. The disc dropped, and seating itself, tightly shut off the line.

To make repairs by the rule of ordinary maintenance would be folly. Only a valve that would prevent recurrence of such trouble would do. And that's how Preventive Maintenance—recommended by G. L. C., the Crane Representative—came into the case.

For two sound reasons Preventive Maintenance prescribed a globe valve with plug type disc. *First,* it could be installed with pressure under the disc, and should the valve fail, it would not stop water supply entirely. *Second,* its plug type disc and seat would offer maximum resistance to the severity of throttling service.

Results: (1) the trouble was remedied. (2) The threat of another costly boiler shutdown due to misapplied valves was removed. (3) Another manufacturer has learned that Preventive Maintenance is sound economy; and that Crane offers not only the most complete and dependable source of valves and fittings, but accurate information on application as well. He knows, too, the wisdom of consulting the Crane Salesman on every piping problem—big or little.

This case is based on an actual experience of a Crane Representative in our Oshkosh Branch.

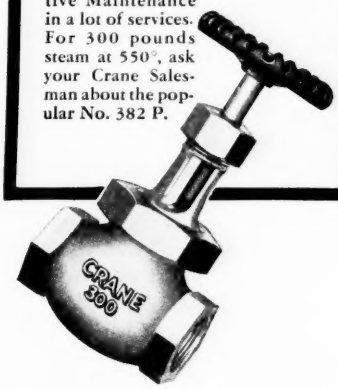
CRANE BRASS PLUG DISC VALVES TAME POWER PLANT FLOW

In your boiler room—in lines where the service is really tough, you'll find these valves exactly right for the job to be done, right for the safety required. Use them for throttling, in soot blower, blow off, boiler feed, in drip and drain lines.

Crane brass plug type disc globe valves are extra strong and durable; they're made of a high-grade steam metal. Their wide seating area is designed to resist the damaging effects of wire drawing and foreign matter. The disc taper assures tightness; permits easy regulation of flow.

Their discs of nickel-alloy and seats of exelloy are a tough combination that gives stubborn opposition to wear, wire drawing and galling.

Available in complete range of pressure ratings, these valves are ideal for Preventive Maintenance in a lot of services. For 300 pounds steam at 550°, ask your Crane Salesman about the popular No. 382 P.



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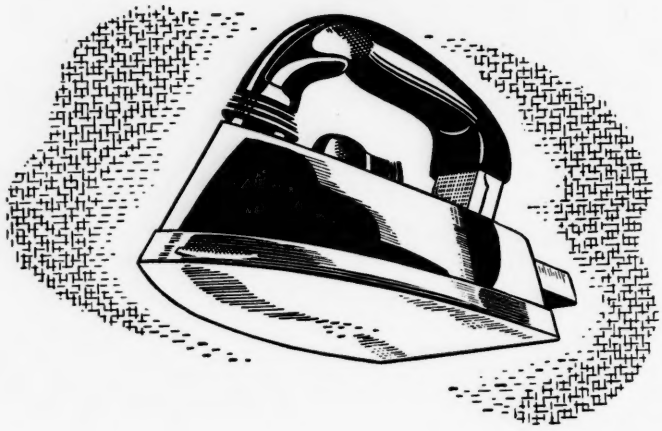

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That calls for a surface which will provide plenty of heat, fast. It does *not* call for lots of weight. For weight, *per se*, does not make an iron more efficient, only more tiring.

A clear-cut specification for Aluminum!

Reduce the weight and save the wrist, yet keep the speed and heat storage capacity,—all by utilizing the lightness and the superior thermal characteristics of Aluminum.

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We have been helping many manufacturers make their products better with Alcoa Aluminum. May we help you? Aluminum Company of America, 2109 Gulf Building, Pittsburgh, Pennsylvania.

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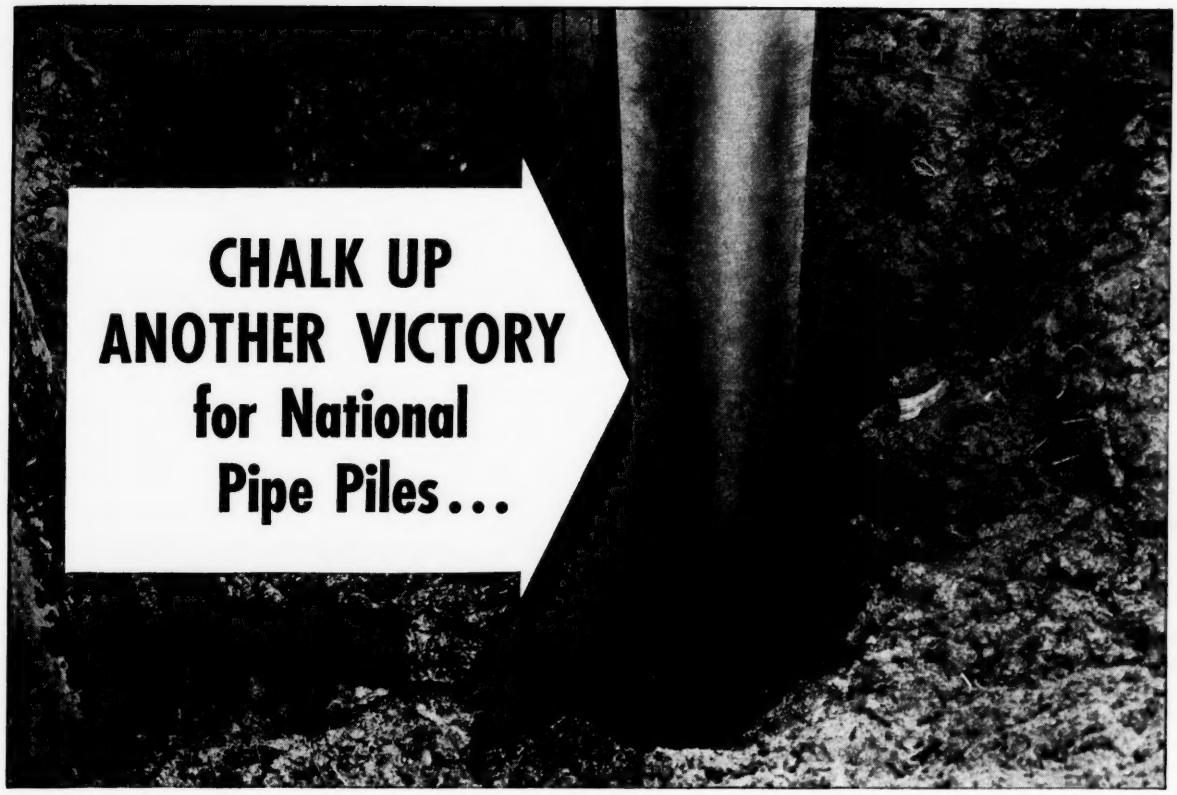
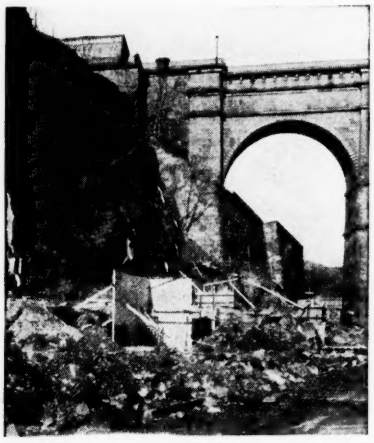


CHALK UP ANOTHER VICTORY for National Pipe Piles...

HERE IS THE type of condition which had to be penetrated to provide solid footing. 8300 feet of 12¾-inch NATIONAL *Seamless Pipe Piles were used. Length of piles could not be predetermined, because of irregular underground rock ledges running along the cliff. Photos courtesy of The Port of New York Authority. General Contractor, Wood & Hagen, New York City.*



WORK MOVING STEADILY AHEAD on the south section of approach to George Washington Bridge from Harlem River Speedway, New York. Piers founded on NATIONAL *Pipe Piles driven through rip-rap to refusal on bed rock.*

Penetrate heavy rip-rap fill to gain solid footing for new George Washington Bridge approach

HERE is more proof that NATIONAL Seamless Pipe makes the most dependable piling for the toughest foundation conditions. In setting foundations for this new approach to the George Washington Bridge from Harlem River Speedway, New York City, engineers encountered rip-rap and boulders, one of the most uncertain and difficult types of fill material to penetrate.

But the job went ahead right on schedule. Engineers had foreseen the tough driving conditions and had wisely specified NATIONAL Seamless Pipe. And today this important approach stands complete, firmly founded on 8300 feet of NATIONAL Pipe Piles, driven to refusal on solid bed rock.

For your next foundation job, use NATIONAL Pipe Piles. They penetrate the toughest conditions. They offer greater supporting strength. They cost less for deep and difficult and uncertain penetration. They can be inspected full length, after driving. They are recognized by leading building codes.

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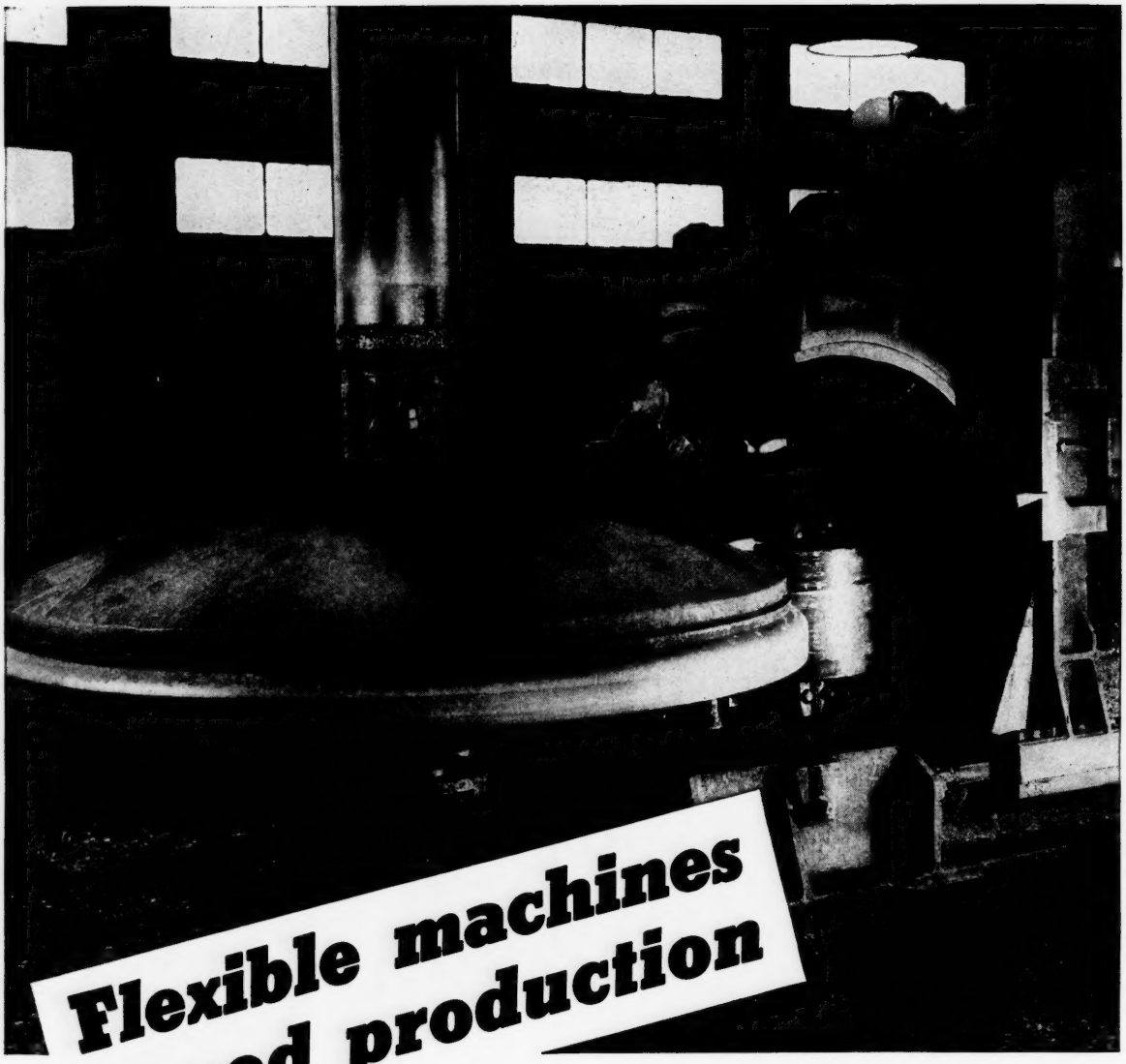
UNITED STATES STEEL



OF FLANGED AND DISHED HEADS

FLEXIBILITY is the keynote of machines in Bethlehem's flanging shop. Thanks to readily adjustable working parts, wide variations in outside diameters, knuckle radii and straight flange dimensions are possible without need for special dies or heavy machine set-up charges. As a result, work that calls for many different forms and combinations of flanging and dishing is handled with maximum speed and efficiency in this flanging shop.

And there's a further factor for speed in Bethlehem's production of practically any style or size of machine-flanged steel tank or boiler head. The flanging shop is located next door to the plate mills and open-hearths of a large steel plant, providing prompt supply of material for heads in any desired grade of steel.

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Wire Rope—*made with a "know-how" that means maximum service.*
Steel Sheets—*Black and galvanized, flat and formed.*
Steel Pipe—*with many plus factors.*
Tool Steels—*A complete range, covering every requirement.*
Open-Web Steel Joists—*for fire-resistive, shrinkage-free floors.*
Reinforcing Steel and Road Steel
Structural Shapes—*Wide Flanged Sections for heavy construction; Light Sections for economical use of steel where loads are light.*
Fabricated Steel Structures of all types

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

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NO wonder he was excited! Here it was after closing hours and a boiler down . . . and, our warehouse 225 miles away! We swung into action, loaded the necessary tubes onto a truck and delivered them the next morning. But that was an emergency, you say—what about regular orders?

Thousands of Scully customers can tell you that we operate on the basis that all orders are wanted immediately. And no matter how large or small your order may be it will receive the same friendly attention and be shipped at once. That's Scully Service.

Why not call Scully the next time you need steel and see for yourself why Scully Service has become famous? And if you do not have a copy of our handy Stock List and Reference Book, ask for one. It's free, of course.

The Mark of Quality — USS Scully Service — *The Mark of Service*

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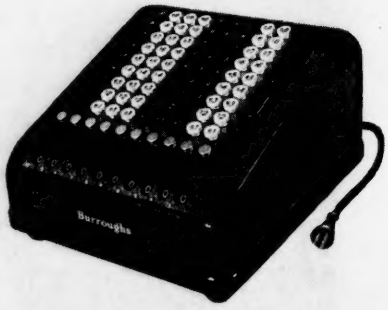
UNITED STATES STEEL

Burroughs

NEW FEATURES *in the* ENTIRE LINE OF BURROUGHS CALCULATORS

A small six-column calculator for handling small amounts. It permits low equipment costs where a machine of larger capacity is not required.

The many styles of Burroughs Calculators include machines of six, seven, eight, ten, twelve and fourteen column totaling capacities, fractional keyboards, electric or hand operation.



Burroughs Electric Calculator with Simplified Subtraction. New speed, new quiet operation, new style. Seven, eight, ten, twelve and fourteen column totaling capacities.

ELECTRIC DUPLEX CALCULATOR

TWO TOTALS

The individual totals in the front dials are transferred electrically to the rear dials where they accumulate into a grand total.

DIRECT SUBTRACTION

A mere touch of this key subtracts an amount directly from the grand total without the use of complements.

FAST . . . QUIET ELECTRIC

Provides a faster, simpler way to accumulate individual calculations into a grand total. Direct subtraction, fast electric transfer, electric clearance, and positive electric key touch speed up the work and enforce accuracy. Other Burroughs Calculators of various totaling capacities also have new features and new advantages. From the twenty-six styles, you can select the one that will give you the shortest, simplest operation on your particular job. For a demonstration or complete information, telephone the local Burroughs office, or write—

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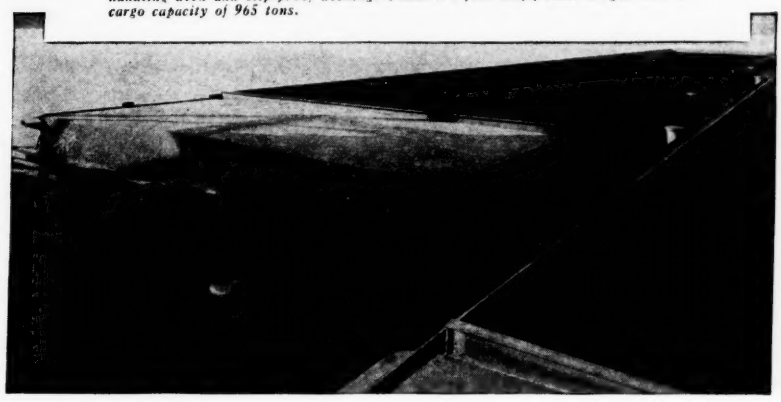
THERE'S A BURROUGHS CALCULATOR FOR EVERY TYPE OF CALCULATING

Note the Features

OF THESE 10 NEW ALL-WEATHER CARGO BARGES

All-welded cargo barges 175 feet by 26 feet by 11 feet, complete with hatches in closed position, also shown before installation of hatches. Note the 2-foot high coaming, hold construction, movable track extensions (for rolling hatches) on the handling deck and slip-proof decking. Under a 9-foot draft, these barges have a cargo capacity of 965 tons.



BARGE construction has advanced a long way since American Bridge Company began its specialization in this field 36 years ago. Features unthought of years ago have become standard practice. Building on this experience, it is no wonder we have been so successful. For example, note the design features of the 10 cargo barges recently launched from our Ambridge ways on the Ohio River.

Complete protection from the elements for cargo is provided by patented, weather-tight hatches that roll on steel tracks attached to the 2-foot coaming.

Ingeniously devised track extensions, which overhang the handling decks and fold back for minimum obstruction during navigation, permit a 40-foot hatch opening over any part of the hold.

Gunwales and handling decks of slip-proof construction safeguard the operating crew.

All-welded steel construction, steel double bottoms and sides subdivided into 6 water-tight compartments, rakes that offer minimum towing resistance. Built to American Bureau of Shipping ✠ A-1 Classification and backed by 36 years of specialization in the construction of barges in which sturdiness, long life and economy of operation are assured.

This experience and service, with ample facilities to cope with any demand, are at your service on your next navigation requirement, whether barge, dredge, lighter or other craft.

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General Offices: **Frick Building, Pittsburgh, Pa.**

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1800 CONSULTANTS
to Help Solve Your Grinding Problems
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INDUSTRY GOING SOUTH

Construction totals in the South for the first three months of 1940, published by *Construction* magazine, show a gratifying increase in private industrial work, which was almost four times the amount for the same character of work recorded in the first three months of 1939. Total construction figures in the first three months of this year amounted to $186,814,000. Of this, private plant construction accounted for $53,078,000. The outlook for new work is good as indicated in March, when announcements were made of private contracts to be awarded of nearly $50,000,000.

An increasing number of nationally known concerns building main plants and branch plants in the Southern States indicates a rapidly growing trend. This applies not only to chemical industries in which the South is fast coming into a position of leadership, but in a widening variety of new enterprises which make it more apparent every day that in this area is seen opportunities for productive undertakings that make a most attractive outlook for broad-scale industrial operations.

Plants announced last month include projects in the gas and oil industry, steam generating and other plants for public utility enterprises; new powder plants by du Pont; also reports of a third new du Pont plant for production of nylon. Meridian, Miss., will see a new building material plant to cost $2,000,000 by the Flintkote Company. The Dow Company is to establish another enterprise to utilize the waters of the Gulf for the extraction of magnesium. This is in addition to the bromine plant of the same company at Kure Beach, N. C. The cost of the Texas plant probably will run to $5,000,000 or more.

In spite of an apparent general business let-down, in spite of unwise reference to the South as an economic problem, there is a steady, definite movement toward great development as investors and industrialists in increasing numbers are turning their attention Southward.

"The South's Resources," which will be an extra issue of the MANUFACTURERS RECORD to be published in a few months, has attracted attention from all parts of the country to a gratifying degree. Substantial business people of many states, owners of important enterprises, investment banking houses and engineers who investigate for others, are eagerly seeking information about what the South has. It is a time of all times in recent years for those development agencies familiar with what this section has to offer to take advantage of the interest shown by spreading abroad to the fullest extent information of the South's resources and its opportunities. No work is more important and many examples may be quoted which point to the success being met with by great businesses which have located in the South in the last few years. All forward-looking interests of the Southern States may concentrate upon an objective that will add to the South's wealth and to the wealth of the country.

For Unemployment and Old Age

An article of interest to employers of labor is printed on another page. Sydney G. McAllister, president of the International Harvester Co., has announced a savings and profit-sharing plan for the employees of the company numbering 50,000. "The main objective," the announcement says, "is to find a way to assist employees in providing retirement and unemployment income."

For years this important manufacturing enterprise has been interested in the objective of greater employee security. Mr. McAllister, mindful of the ups and downs of business, refers to unemployment as of paramount interest and concern to management desirous of doing everything possible to reduce such hardships to employees.

Various plans for employee security have been put into effect by industry generally in recent years. Enlightened management in increasing numbers instituted ways by which old age could be provided for and the difficulties of unemployment lessened.

With the adoption of Social Security by government and its tax upon employers and employees, not a few firms found it necessary to abandon the protective insurance in effect due to the dual expense.

The International Harvester Company's first pension plan had its inception in 1908. Under it more than 5,000 former employees have received pensions and other thousands will receive pensions in future years. In his statement the president of the company says: "Passage of the federal government's old-age pension plan made it necessary for us to revise our pension plan. As we studied the problems raised by those revisions, we became convinced there was no single means of approaching the goal of employe security, and a program embodying a two-fold approach to the problem would be most effective. That is what we have tried to do in providing for unemployment as well as old age. In the protection it offers, the new plan supplements governmental plans."

Number Of Unemployed

The total number of unemployed workers in the United States went up again in February for the fourth consecutive month, according to the National Industrial Conference Board.

The record of the Board shows that the total is now 9,436,000 unemployed workers, which is the highest number since April 1939.

One of the reasons advanced for some of the rather intimate questions asked by census takers is that the answers will reveal accurately the number of those out of employment, about which there has been a great deal of mystery. Sometime ago, yielding to the widespread demand for correct information, a cross section census was taken by presidential authority, but it was admitted that it fell short of getting complete facts. Estimates vary. Those made up by the labor unions do not agree with figures published by other sources, and expressions of doubt are frequently heard as to whether the figures are placed too high or too low according to whatever special purpose may be in view.

Probably the Conference Board survey is as accurate as can be obtained, short of a house to house canvass.

Remove Impediments To Progress

The Interstate Commerce Commission's refusal to reconsider its decision granting the South freight rates on a parity with other sections is another point gained in the long fight by Southern interests for equality of transportation charges.

The maladjustment of freight rates has been a serious handicap to Southern merchants and manufacturers seeking a wider market for their goods.

The retention of discriminatory rates as urged by Northern interests appearing before the Commission, their plea being based wholly upon fear of Southern competition and not upon justice, would have been a monstrous wrong.

The adjustment of rates so far applies only to a limited list of commodities, but eight Southern states recently filed another petition with the Commission praying for the removal as against the South of "the highest livestock freight rates in the United States." It may be expected that efforts will continue to have adjustments made where inequalities exist.

Nature has endowed the South with resources beyond other sections. Should the South be handicapped because of them? That is what New England has asked. It was inevitable that cotton finally should be manufactured in the South instead of being transported 500 and more miles. It is also inevitable because of these advantages that the world, already recognizing the peculiar fitness of this area for the rapidly developing pulp and paper and the chemical industry generally, will find increasing opportunity here for a wide variety of products.

Such development follows the line of least resistance, and changes should be made not only in the matter of discriminatory freight rates, but in regulatory legislation which tends directly to hold back vast development.

Too often unwise laws have been enacted through the pressure brought upon politicians by selfish business interests of other sections unable to meet the competition of Southern producers. The

lumber, textile and other interests of the South are convinced that it was such pressure that brought the wage and hour bill into existence.

The testimony before the Interstate Commerce Commission in the freight rate case revealed a desperation on the part of representatives of large industrial interests of other sections difficult to understand. Their inheritance of skilled labor in highly industrialized areas, their valuable precision work in many lines of manufactures have not been impaired. The opportunity is wide and open to them for greater accomplishments in the future.

The South does not detract nor attempt to detract from their advantages, but it is on strong ground when it proclaims its own and insists that artificial handicaps which have operated against its widest development for a long time shall be removed.

It may be expected that the Southern Governors' Conference and those who have been indefatigable in their efforts to see that justice is done the South will persist and be on guard against further moves to create legalized obstructions to the natural growth of a section endowed by nature with a wealth of resources found nowhere else.

States' Rights

Reform efforts persist while recovery waits. High taxes and uncertainty about the future do not breed confidence. Nor does mounting debt, even though Mr. Morgenthau says he is not alarmed by a $50,000,000,000 limit.

Widespread confidence would bring money out of hiding, cause increased venture into new fields and altogether change the picture in buying, building new homes of which so many are needed, and create an outlook that promises results instead of the one we have which is, to say the least, indefinite if not bleak.

This country was not developed, nor were its growth and wealth attained by having its affairs handled by Washington, as we have permitted in recent years. The word permitted is not the right word; encouraged is a better one. This centralized rule; this over-lordship, unfortunately, are largely due to the appeal that has been made to Federal government for every conceivable kind of aid.

The strength of the union of states has rested upon the regard and sacredness of state's rights, and when men refer to the disappearance of such rights they speak of a loss that unless retrieved will mean disintegration. If we persist down the road we have been traversing and which has been pretty well traveled so far, of federal control of everything, there won't be any such thing as state's rights.

There have been signs of awakening to the danger by some of our local and state leaders. It is well that these leaders see the danger, because in their hurry to Washington to get federal money, in their pleas for help, the door was left open for federal entrance.

State's rights are not all on one side. They carry with their maintenance a responsibility not to be overlooked.

It used to be that the state cared for its own; it used to be that the function of government did not contemplate taking taxpayers' money with which to make charitable contributions for any class, or city, or state. But as this is written Congressmen are making speeches on how much money ought to go to farmers and be allotted to various localities for relief. The council of mayors is reported to have raised its request for aid to $1,500,000,000. It is not in the province of Federal government to spend taxpayers' money for such purposes. The longer it is kept up the further we will get away from what has been a fundamental requisite in the successful life and progress and wellbeing of the America we have known in the past.

We quote from an article by Shelby Myrick in the Savannah News:

"Whatever was left of the Democratic doctrine of State's Rights, however, has been completely obliterated, strange to relate, by the Democratic party. It is undeniably true that the present Democratic administration, entitled 'The New Deal', either by numerous acts of Congress or by new interpretations of the Constitution by New Deal judges, has brought about almost complete regulation of the lives of our people and of the affairs of our states by the federal government.

"There is scarcely any field left within the states which has not been taken over or interfered with by federal laws.

"Our local banks are now completely federalized; our agriculture is dominated by federal laws and federal appropriations.

"A farmer cannot plant a crop without the approval of the federal government.

"The State Social Security and Unemployment laws are intimately bound up with federal laws, because the federal government contributes to the same.

"Our main highways are federal highways, and federal funds have been withheld from time to time by reason of controversies in the State Highway Departments.

"Our elections are governed and restricted by federal laws.

"Moreover, since the present Democratic administration assumed office, our public buildings and all kinds of public improvements are constructed by federal grants of money, and Washington is the mecca of city, county and state delegations from one week-end to the other imploring federal grants and federal assistance."

MOVIES AID MODERN INDUSTRY

In Product Research, Testing, Marketing, New Techniques Are Proving Their Value

BY

Lawrence R. Martin

Eastman Kodak Company, Rochester, N. Y.

EDITORIAL NOTE: *Mr. Martin, author of the following article, is a mechanical engineer engaged for the past nine years in the design and engineering of motion picture camera equipment for the Eastman Kodak Company. Several of the applications of motion picture technique to industrial problems, described by him, are drawn from his personal experience. In some, he conducted the field work; and illustrations accompanying the article are single-frame enlargements from his 16 mm. motion picture records.*

WHY should a machine fail at 600 r.p.m. when it operates satisfactorily at 500? At what point in the cycle does the wheel of a speeding locomotive fail to ride the track? What happens when a high-speed machine is started and stopped? How can a complicated product be best presented to a busy buyer? In recent years, industry has turned more and more to motion-picture photography, for help in solving these and hundreds of kindred problems.

Today, there is hardly an industry or product to which motion pictures cannot be applied with advantage—in research, in testing, in selling, in consumer education. The unique value of the motion picture is that it can present things as they happen—action as it occurs—with a force and realism equaled by no other medium. Second, motion picture technique enables us to compress or extend time—slowing down swift action so that it can be analyzed, or crystallizing moments in a long process, at pre-selected intervals, so that stages or changes are recorded for later analysis.

Through motion pictures, the performance of manufacturing equipment can receive analytical study. The labor time spent on a product can be measured and evaluated accurately. If an article contains moving parts, the relation of motion to time in its various cycles can be recorded. Finally a perfected product—often perfected through research aided by motion pictures—can be presented to best advantage both to the sales force and the ultimate consumer, through the same movie medium.

Since the beginning of the twentieth century, industry has found use for motion pictures. Some of the earliest "flickers" were made for advertising purposes, and many of the technical advances in the movies have come as a result of the demands of advertisers for more spectacular effects to draw attention to their particular product.

A second basic use of motion pictures in industry has been in the time-study field. Motion pictures are taken of an operator or an operation at a fixed rate of speed and can be examined by the time-study department without annoyance to the operator. Far greater accuracy as well as a permanent record is thus obtained of every study. Several industries have carried the time-study motion picture into advanced phases. In one of these, the motion picture of a given operation, as performed by the best operator in the field, is made into a continuous loop and can be shown to new operators to acquaint them with the type of work they are about to do and to teach them the proper way to do it. Teaching with motion pictures is often carried beyond the shop into the field of sales. Many companies now use motion pictures to acquaint the salesmen in the field with new products and special techniques in selling those products. There are two principal advantages in doing this with motion pictures rather than personal contact. The psychological effect of a darkened room with a brightly illuminated screen centers the interest on the subject under consideration and eliminates the subconscious distractions attendant to demonstrations in a lighted auditorium. In addition, it is possible, by properly choosing the viewpoint from which the pictures are taken, to show every phase of an operation or a product to its best advantage to a relatively large group of people compared to the number that could view the operation itself.

Both of the two basic forms discussed above use motion picture technique essentially as in the entertainment field. The subject on the screen appears as it might be viewed directly. Occasionally, the use of long focus lenses or slow-motion improve the effect of this personal view as these devices are used on the entertainment screen.

In recent years, however, a new use of motion pictures has been developed almost exclusively for the use of industry. This is the photographing of machinery and mechanisms on an exaggerated time scale for use in analysis of the machine motions. This field differs from the conventional type of pictures particularly in the rate at which the successive pictures are taken.

Motion pictures are by definition a series of regular and consecutive photographic images. Experiments in the latter half of the nineteenth century with viewing devices known as the Zoetrope or Bioscope, developed the fact that a series of images viewed in rapid succession have the appearance of a continuous moving image. In the earliest forms of these instruments, the images were produced by drawings similar to the individual cards photographed for animated movies today. The earliest photographs that were used in these devices were made by taking individual pictures of a subject in a succession of carefully posed positions. As can be seen, this was a laborious and difficult task.

The first photographs that were ever made of a moving object in a regular and consecutive manner were made by a series of still cameras designed especially for that purpose. Mr. Leland Stanford owned a racehorse which had an unusual gait. Wishing to examine this gait analytically, he commissioned an engineer to design a series of still cameras to make successive pictures of the horse in motion. The pictures were examined individually with no thought of any further application. In the following year Mr. Stanford

went to England and, among other things, took with him these photographs. While there he heard of the experiments being made with the Zoetrope, and similar instruments, and had one built of a size to accommodate his photographs. On examination they gave the appearance of what would now be called a slow-motion movie of the horse. Thus, we have seen that the first pictures taken under the present definition of motion pictures were actually made to analyze a motion.

The effect of exaggerated speed on the screen is caused by a difference between the picture frequency of the camera and projector. A silent motion picture projector operates normally with sixteen picture changes per second, and silent pictures are ordinarily filmed at this speed. But change the filming speed to 64 frames a second, project the resulting film in a projector running at normal 16-frame speed—and subject motion is slowed down to one-fourth of normal. Vastly higher filming speeds than 64 frames-per-second are practical today. Conversely, subjects may be filmed at a much lower rate than 16 frames, and when these are projected all action appears speeded up on the screen. In this manner, the motion picture camera and projector can compress or extend time at will.

The field of industrial analysis can be divided into several sections based upon the picture frequency or the rate at which the individual images are made. The three basic sections into which the present day field of industrial motion pictures can be divided are as follows: A very low speed band extending from about one picture per second down to one picture per hour or longer, an intermediate band from approximately one picture per second up to about 150 pictures per second, and a high-speed band from approximately 100 pictures per second up to well above 10,000.

The first or low-speed group contains the pictures that are taken as growth studies or "time lapse" pictures. Several interesting applications have been developed in this field. Experiments have been made by the aviation industry with transport liners equipped with a dual set of the essential navigating and engine instruments. A motion picture camera driven by a small electric clock motor is adjusted to photograph this second instrument panel at five-minute intervals. In this way, it is possible to obtain on a fifty-foot roll of 16 mm. film a permanent record of a flight of a great many hours duration. Should anything occur during the flight, a record of which should be made at more rapid intervals, the pilot need only touch a button to increase the rate of filming to one picture every five seconds. Records of this type could be invaluable in settling disputes after an accident or establishing facts concerning a trip.

Another interesting application in this same field of recording concerns the installation of several huge spheroidal gasoline tanks by one of the large producers. This spheroidal type of tank, whose advantage is its ability to store gasoline under pressure, has a very complicated internal structure supporting the curiously shaped outer skin. The tanks were built and equipped with a fluid level indicator showing the depth of material in the tank, but the complicated cross section made it extremely difficult to compute the gallons per inch of depth.

It was felt that photography could assist in calibrating these tanks, and the following technique was employed. The input to the tank, consisting of a 6-inch pipe, was divided into four 3-inch lines and on each of these was mounted a flow gauge with a 14-inch dial. Two cameras were used, each having single frame remote control through an electrical system. The camera operator watched the rise of the fluid as indicated on the depth gauge, and at every inch of rise he made simultaneous photographic readings of all four indicators. After the film was processed, it was possible by projecting these records one frame at a time, to read the dials accurately enough so that a practical calibration of the tank could be

(Continued on page 54)

FROM TOP TO BOTTOM—

1. *Enlargement from 16mm. movie frame taken by high-speed camera shows locomotive's main driver lifting off rail approximately one inch at slipping speed of about 120 m.p.h., demonstrating the need of a redesigned driver balance for greater safety and more efficient performance.*

2. *The irregular shape of this gasoline storage tank made it impossible to correlate the gallonage with the fluid level.*

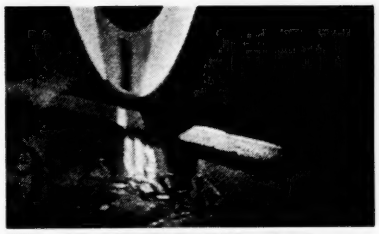
3. . . . *But photography made calibration of the tank a simple process. Movie cameras were set up to photograph a grouping of flow meters, at each inch of fluid level. From the data so recorded, a curve was readily plotted showing the gallonage at each level.*

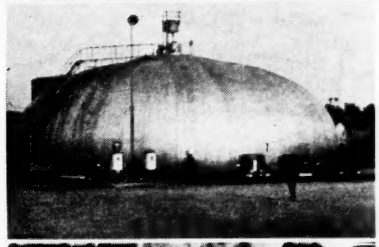
4. *Performance of a high speed winder is analyzed by means of the movie camera. Movies demonstrated why the winder did not function properly above a certain speed, and pointed the way for a redesigned, improved machine.*

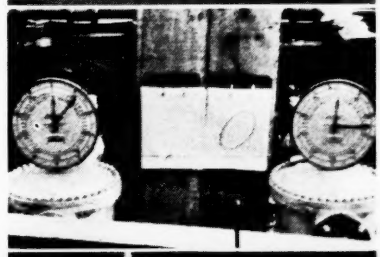
5. *Motion pictures are utilized by the Eastman Kodak Company to study certain of its own products. This is a Magazine Cine-Kodak with the exterior cut away to facilitate movie analysis of a patented shock-absorbing stop lever.*

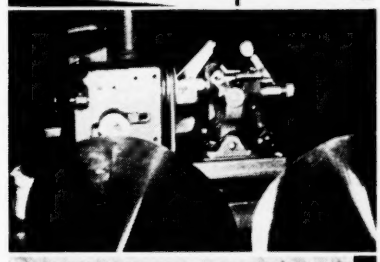
6. *An extreme close-up of the movie camera stop lever (center). Lever is up and film transport mechanism running freely.*

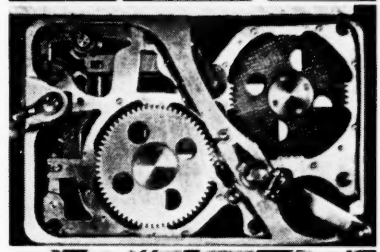
7. *Here, stop lever is closed. On the movie screen, at normal projection speed, the shock-absorbing action is clearly perceptible, although it is much too quick to be observed by direct visual study of the mechanism.*

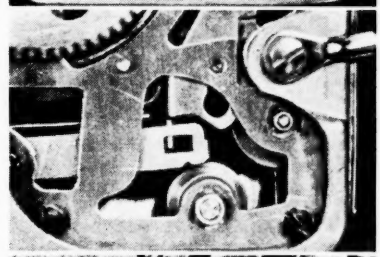


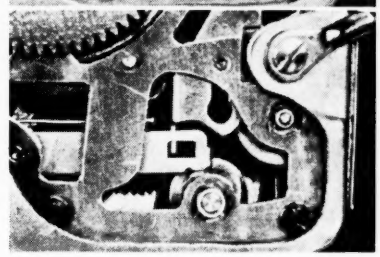












INTERNATIONAL HARVESTER EMPLOYES GET NEW SAVINGS AND PROFIT-SHARING PLAN

A NEW two-fold plan to reduce the hazards of unemployment and old age for International Harvester Company employes by means of savings and profit-sharing was recently announced by Sydney G. McAllister, president of the company.

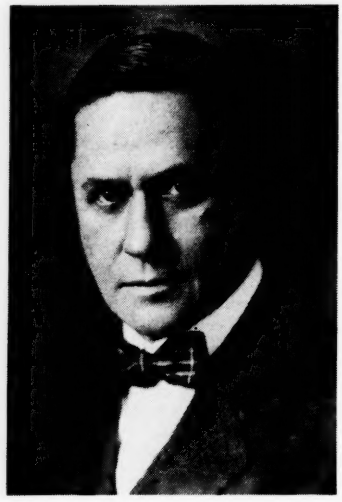
The plan which becomes effective May 1, will apply to about 50,000 American and Canadian employes in all departments of the company. It is known as the Employes Savings and Extra Compensation Plan but will not apply to the managerial group of employes, who will be provided for otherwise.

Under the plan, an individual account will be created for every employe who participates. Employes who have more than one and less than three years of service, whose participation will be limited, may deposit even percentages from one up to 10 percent of their salary or wages and receive interest from the company.

Employes with three or more years of service will receive the full benefits of the plan. Into their accounts will go money derived from three sources:

1. The employe voluntarily may save up to 10 percent of his salary or wages.
2. If he does save, the company will match his savings on a 50 percent basis up to a maximum of 5 percent of his salary or wages. That is, the company will give him special matching credits up to a maximum of 2½ percent of his income. It also will pay him interest on both his savings and the matching credits.
3. The company will distribute to employes 25 percent of all earnings in excess of $3 per share on the common stock. This formula is automatic. The individual employe's share in this extra compensation will be determined in proportion to his salary or wages. Every eligible employe will receive extra compensation when it is paid, regardless of whether or not he takes part in the savings features of the plan.

It is estimated that the savings features of the plan will cost the company more than $1,000,000 annually, regardless of whether business is good or bad. It is not possible to predict the amounts of profit sharing, since it will depend upon future earnings.



Sydney G. McAllister, President International Harvester Company

The rules governing withdrawal of money by employes from their accounts are a distinctive characteristic of the new plan. They are, briefly:

1. An employe may withdraw his own unmatched savings deposits at any time for any purpose.
2. He may also withdraw at any time the savings deposits on which he has received matching credits from the company. But, if he withdraws these deposits for any reason except unemployment or retirement, he forfeits the matching credits on the amount withdrawn.
3. As to extra compensation from profit-sharing, the employe may withdraw one-half at any time for any reason. The other half may not be withdrawn for any reason except unemployment, retirement, or termination of service with the company.
4. In any week during which an employe receives less than 60 percent of his normal full-time earnings, including any government unemployment benefits or income from outside employment, he may apply for and receive from his account enough to bring his income for that week up to 60 percent of normal. Such withdrawals involve no forfeiture of matching credits.
5. When an employe retires he receives the entire amount standing to his credit in his account, usually in the form of annuities. Other forms of settlement may be made if the employe and the company agree that they are more suited to his needs.
6. If an employe resigns or is discharged for cause before retirement age, he will receive all his savings and all extra compensation credits, but will forfeit matching credits on his savings. However, if his employment is terminated before retirement because of lack of work or a physical disability, there is no forfeiture and he receives the entire amount in his account. In the event of death before retirement, his entire account is payable to his estate.

Under no circumstances will any money from the employes' accounts ever revert to the company. When matching payments are forfeited, for instance, the money does not go back to the company, but goes into a general fund for the benefit of all participating employes.

The whole plan was designed to afford the kind of security which the particular employe needs.

For instance, a man of relatively short service with the company may be laid off during periods of slack business. For him the plan emphasizes unemployment compensation. Older employes are less likely to be laid off and their chief interest is in retirement. For them, the plan emphasizes that feature, since all their savings and extra compensation credits can be devoted to retirement income. Furthermore, as the young employe adds to his service and is better protected against lay-offs by seniority, the plan automatically adjusts itself and begins to build retirement income for him.

Commenting on the general nature of the plan and the reasons for its adoption, Mr. McAllister said:

"The very nature of our company's business is such that it involves large fluctuations in sales. That is typical of our industry. When business conditions are bad, purchases of our goods can always be postponed and employment suffers accordingly.

"Consequently unemployment is a problem of paramount interest to employes and it has been a concern of the manage-

(*Continued on page* 54)

THE FREE ENTERPRISE SYSTEM IN AMERICA

BY

H. W. Prentis, Jr.,

President, The National Association of Manufacturers

EVEN the severest critics of American business and industry do not seriously attempt to deny that free private enterprise has been responsible for the amazing development that has come to us as a nation in the relatively short space of 163 years. The ingenuity, ability, and energy of our people have not been hampered by the shackles of oppression. Under our constitution we started as a free people. Our liberties were guaranteed by that immortal document and under it we established our system of free private enterprise. Our economic, political and religious freedom stand or fall together as the tripartite foundation of our American way of life.

In view of the vital part free private enterprise has played in building America, logic would seem to demand that business be encouraged in every reasonable way, protected against unwarranted assault from any quarter, and freed from unnecessary burdens so that it may again function normally and resume the progress that was interrupted by the depression of 1929.

For several years business has been under attack by government spokesmen of every rank. It has been hamstrung in first one direction and then another. Business itself has been partly to blame for this unfriendly atmosphere in Washington. Abuses had developed over the years. Mistakes had been made. However, at no time in our history has the attitude of business men in general concerning their obligations to society been more enlightened than it is today. Much remains to be done, but business men have developed a real social consciousness and are giving concrete expression to it. We doubtless have been at fault in the past for not having made a greater effort to see that the public had a clearer insight into the function of private enterprise in the economic life of our country, and the relation of its freedom to human freedom in general. A major purpose of the National Association of Manufacturers is to see that information on that vital subject is made available to all sections of our population.

Business has no desire to go back to the age of laissez faire. That era is definitely behind us. Let it remain there. Wise and reasonable regulation of industry is necessary to protect the public interest and the rights of the individual—the very rights that have made possible the growth of the system of private enterprise. But, at the same time, business believes the work of the referee should end with fairly-administered regulation. It should not be carried to the extent of control, which means regimentation and dictatorship—the absolute antithesis of freedom as understood by our liberty-loving people.

On several occasions the reason given by governmental officials for pouring out more billions of dollars and further unbalancing the budget and increasing the debt was that unless business provided jobs, government must do so. Such a course might be justified in an emergency, but it is certainly not sound procedure as a general policy. Moreover, while proclaiming that principle with one hand, government reached out with the other to place further restrictions on private enterprise, thus reducing the opportunity to extend private employment. How business can be expected to solve the unemployment problem if subjected to increasing controls is becoming a more serious question every day.

Most thoughtful citizens will concede that the only lasting solution of the unemployment problem, which continues to disturb the nation despite all artificial measures inaugurated to eliminate it, is to place idle men in good jobs at fair wages. So long as millions are unemployed through no fault of their own, their needs must be provided for. But certainly no adequate form of relief can be established permanently without steadily lowering our standards of living, with financial and social chaos perhaps at the end of the road. The real answer to the question is to provide regular jobs and steady payrolls.

As the present head of the National Association of Manufacturers, I am happy to say that manufacturing industry has a surprisingly good record in the matter of providing jobs for willing hands. In general, employment in our factories today is about at the level of 1929, so often referred to as the peak year. In some lines of manufacturing, employment is well above the 1929 level. This record has been accomplished despite tremendous handicaps. What unemployment there is today is principally in other than industrial fields.

Industry is ready to go ahead at full speed—to grow and to expand. Before it can do so, however, the fog of doubt and confusion that clouds the business horizon must be dissipated. Responsible management must have reasonable assurance on which to base forward-looking plans. For example, business men need to know that a year or two hence the national currency will be no less valuable than it is today. Those who own capital and would invest it in new ventures and improved plants have a right to know their investment will be secure and that they can expect some reasonable return for the risks they take. By the same token, business, in order to make plans intelligently and act upon them affirmatively, needs to know that our government will not enlarge its present functions by engaging in enterprises that furnish unfair competition for private business men who are supporting the government with the taxes they pay.

The confusion that exists in the present relationship between government and business is well illustrated by the following incident. A member of the cabinet went to the representative of one of our great manufacturing industries, who happened to be a close personal friend, and asked almost tearfully why it was that government could not do or say anything without being criticized by some business spokesman. His business friend told him he was strongly opposed to such

(*Continued on page* 58)

CRUDE AND SYNTHETIC RUBBER

THE question of an adequate source of rubber supply for the United States constantly arises. Such discussions in the past have interested the South principally in an academic manner but today the subject has more than a passing interest for this region. One reason is because rubber using industries have recently located in the South, while another reason is that the much talked of synthetic rubber, if and when it is actually produced, will be made from petroleum, and most of this country's petroleum comes from the South.

There is no secret about Standard Oil Company of New Jersey's interest in "ersatz" rubber, or the fact that they have acquired the rights to manufacture many, if not all the various types of Buna rubber, but reports that plans had been completed for a new $1,000,000 plant are denied.* The manufacture of synthetic rubber is not new, but commercial production in this country together with costs of production and other economic factors are matters that must be reasonably proven in advance if the venture is to be given an even chance of success. In other words, granting the claim made by some people that this synthetic rubber is superior in many respects to the natural product, such superiority is only practicable if it is economical. At the present time several rubber-like materials are obtainable on the market which could be increased from the present capacity of 6,000 tons annually if the necessity arose. Also, it is probable that under mass production the price could be materially reduced—one of the lowest priced substitutes is now approximately double that of crude rubber while others range up to nearly five times as much—but even that would not solve one of the biggest problems, which is the difference in specific gravity necessitating from 1⅓ to 1¾ pounds or more of substitute materials to displace one pound crude rubber. The full significance of these facts is apparent when it is realized that the present price of crude rubber is only about 20 cents per pound. At the same time its importance can be gauged by the following: on a value basis, crude rubber was the most important single commodity imported into the United States in 1937 and it is interesting to note the domestic rubber goods manufacturing industry employed 120,000 persons in 1937 and had a total output valued at $883,000,000.

Normally, about 500,000 long tons of crude rubber are consumed annually in this country. Of this amount however, approximately 70,000 tons are saved or replaced by about 140,000 tons of reclaimed rubber by plants which, if operated at full capacity, could produce slightly over 250,000 tons or between 20 and 25 per cent of our normal crude rubber requirements. The United States for several decades has imported more crude rubber than any other country and as recently as 1938 it accounted for nearly 44 per cent.

Crude rubber is not produced in this country although attempts have been made to cultivate guayule, the wild desert shrub of Mexico and the southwestern part of the United States, from which latex is obtainable. Guayule also grows in other places but it is regarded as extremely unlikely to ever be more than a negligible source of supply for latex. Approximately 97 per cent of present world supply of crude rubber comes from the Middle East—52 per cent from Malaya and other British possessions, and 33 per cent from Netherlands Indies. Strangely enough, although more than 90 per cent of the current supply of crude rubber is obtained from Hevea trees and particularly Hevea brasiliensis which is a native of Brazil, yet less than two per cent is produced in South America. Since 1912 when production amounted to 49,000 tons, South American production has declined largely as a result of a leaf disease. A considerable time is necessary to prepare land for planting, after which about five years are required for trees to come into bearing, consequently, with cheap labor and production costs in the Middle East, it is not considered likely, even if new strains of rubber trees are developed, that the American continent will be able to produce more than a small percentage of this country's present crude rubber needs.

A few American companies which use large quantities of crude rubber have plantations in foreign countries but collectively their more than 300,000 acres (of which, only about 200,000 acres are in bearing) produce only about 30,000 tons annually or approximately six per cent of all crude rubber imported into the United States. Total world plantings aggregate almost 8,500,000 acres and shipments of crude rubber from all producing countries in 1938 were 895,000 long tons (production figures are not available).

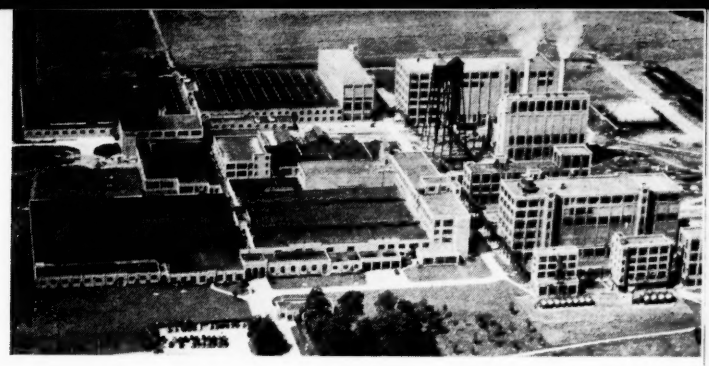
Shipments of rubber from the Middle East are subject to the control of the International Rubber Regulation Committee formed by the British, Dutch, French, and their governments whose areas jointly account for practically the entire world crude rubber production. The objectives of the agreement which became effective June 1, 1934 and was renewed in 1938, are to keep world stocks at a normal figure and adjust supply to demand in an orderly manner, at the same time making all the rubber available that may be needed and maintaining a fair and equitable price level which will be reasonably remunerative to efficient producers. The committee, which meets from time to time to determine and adjust allowable exports to changes in demand, has been advised by representatives of rubber goods manufacturers in this country and Europe on the subject of stocks and exportable percentage. It is interesting to note that while many manufacturers in the United States are in favor of the agreement since it has enabled them to purchase crude rubber at a less variable cost and has removed somewhat the speculation on inventories (the U. S. Tariff Commission states that, "In the past, domestic manufacturers collectively have probably lost or gained as much as several million dollars in one month owing to changing prices"), a few dislike the plan and express apprehensiveness of the "artificial device" failing to cite any specific disadvantages. In the matter of price, the results are interesting: between 1910 and 1933 the average price at New York in cents per pound varied from a high of 206.6 in 1910 to a low of 3.4 in 1932 with fluctuations between high and low in a given year ranging from 147 to as little as 2⅛; from 1934 to 1938 inclusive when the agreement was in effect the average price ranged only from 12.3 in 1935 to 19.4 in 1937. In 1939 when Germany invaded Poland the price was 16½, increased to 24 on September 5, declined to 20 on November 16, with further declines to 18½ and 17½ for March and October 1940 deliveries respectively.

Principally because of the greatly increased consumption of crude rubber in the United States during 1939 compared with 1938—465,000 tons in the first ten months of 1939 against 340,000 tons in the same period of 1938—the stocks of rubber on hand shortly after the start of

(*Continued on page 56*)

*At time of going to press comes the report that Standard Oil Development Company has made an agreement with the Standard Oil Company of Louisiana for the construction of a 10,000 pound daily capacity synthetic rubber plant at Baton Rouge, La.

THE STORY OF VINYON



The New Textile Fiber

BY

William G. Luttge

American Viscose Corporation

FEW modern tales of chemical and industrial development are more impressive than the story of Vinyon, the new textile fibre. Introduced a few months ago by the American Viscose Corporation, which is the first producer to make this product, Vinyon fibre has progressed rapidly and is establishing its suitability to a steadily widening range of uses.

The story of Vinyon fibre has two principal divisions—its chemical origins and its manufacture. These will be considered in their sequence.

Chemical Origins of Vinyon: Vinyon fibre is made from a Vinylite resin which in turn is derived from natural gas (or coal), salt, water and air. This resin, a cojoint polymer of Vinyl chloride and Vinyl acetate, is manufactured by the Carbide & Carbon Chemicals Corporation at South Charleston, W. Va.; its development followed many years of experimentation. The manufacturing processes involved in the conversion of the raw material to the resin form, are intricate. The story of Vinylite resin goes back more than 100 years. The first known record of Vinyl serum from which the resin is produced, was in 1838; in that year Regnault observed the formation of a white powder when sealed tubes of Vinyl chloride stood in the sunlight.

Manufacture of Vinyon Fibre: The evolution of the new fibre is interesting. It begins as a white fluffy powder, which is converted into a textile by modification of the so-called "dry spinning" process. The new textile fibre is made in two general forms, continuous filament yarn and staple fibre. It is now in commercial production at the acetate rayon plant of the American Viscose Corporation at Meadville, Pa. With respect to sizes, present spinning schedule for Vinyon yarn include 60 den. 46 fil.; 120 den. 92 fil.; and 180 den. 138 fil.; other counts can be spun, if such should be desired, for applications not adequately covered by the above sizes.

The fibre possesses a number of unusual characteristics and properties, indicating its adaptability to many textile fields. From the chemical aspect, it has inertness, unusual resistance to mineral acids and alkalis and miscellaneous corrosive chemicals. From the physical aspect, it has exceptional versatility. The product lends itself to processing which permits producing yarns with a wide range of tensile strengths and elastic properties.

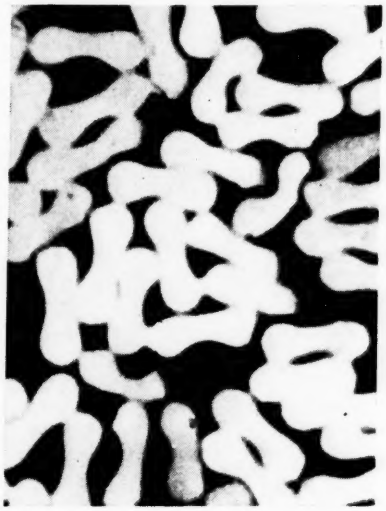
As the procedure of Vinyon manufacture is followed, a dramatic picture unfolds.

Six Steps in Manufacture

There are six major steps in the production of Vinyon fibres and yarns; all of these take place within the rayon plant. The procedure is as follows:

First: The Vinylite resin, from which Vinyon is made, is delivered to the rayon plant in the form of a white powder of very fine consistency, rather like flour.

Above—The Meadville, Pa., plant of the American Viscose Corp., where Vinyon is now being produced. Below—Cross section of Vinyon filament magnified 1200 times.



Second: The resin is emptied into agitator mixers and dissolved in acetone. It is then filtered and stored in tanks. In the dissolving process it is kept at a temperature of 50 degrees centigrade. (When cold it has a gelatine-like consistency.) At the time of being stored in the tanks, the heated solution is clear and has the general appearance of a heavy syrup. In this state it is known as "Vinyon dope."

Third: From the tanks the Vinyon dope goes to the spinning machine which is standard acetate rayon spinning equipment. The process here is substantially the same as that used in making acetate rayon, except that higher air pressures and temperatures are used. (Heating is of major importance at this point. The temperature required for spinning Vinyon dope is double that required for acetate rayon. As with acetate, the dope is converted to a textile yarn at the spinning machine.)

Fourth: The yarns are stretched to increase tensile strength and reduce extensibilities. During this operation the factor of elevated and strictly controlled temperatures is important.

Fifth: The yarns are oiled and twisted.

Sixth: Yarns are redrawn on cones and spools and then are ready for shipping.

The Stretching Process

Probably the outstanding specialized task in making Vinyon fibre is the stretching process which follows the spinning. Before the spinning, except for the temperature and pressure problems above mentioned, the procedure is substantially the same as in the manufacture of acetate rayon. After spinning, heating and pressure become of paramount importance. The most perfectly spun Vinyon fiber can be improved or injured during the stretching process. The regularity of denier, tensile strength,

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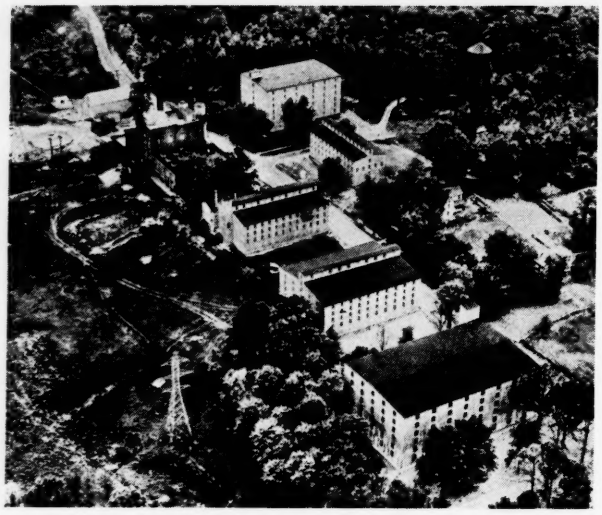


NEW BOILER PLANT INSTALLED

The Hunter Baltimore Rye Distillery at Gwynbrook, Md., showing the boiler house in left background

BY

Harold G. Burrill

Consulting Engineer, Baltimore, Md.

DUE to growth in business the Hunter Baltimore Rye Distillery found it necessary to add more warehouse capacity to their Gwynbrook, Maryland, plant. This called for more steam, hence greater boiler capacity.

A careful survey of the requirements indicated that two 400 h.p. boilers would take care of present loads and give reasonable assurance of the new plant being able to take care of any future requirements.

Accordingly, two 407 h.p. Edgemoor Boilers, 200 pounds pressure were secured from another plant and installed with Edgemoor Superheaters and Diamond Soot Blowers, giving about 40 degrees superheat, in order to insure dry steam over wide areas covered by the warehouses. These boilers replaced three 150 h.p.-H. R. T. boilers operating at 125 pounds pressure.

An analysis of the local coals available indicated that pulverized fuel would work satisfactorily, even though the load varied over a twenty to one range. Boiler loads permitted brick set furnaces, which were installed by George Dashiells & Sons of Baltimore, Md. The ash pit was thoroughly insulated and air cooled, and air drawn through the hollow tile lined ash pit by the fans on the pulverizers.

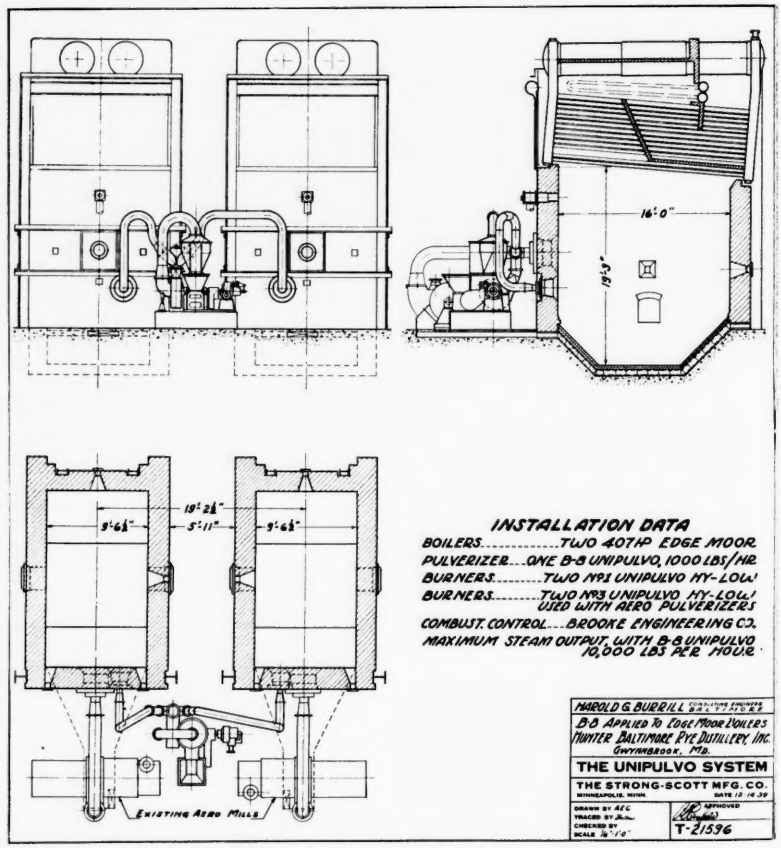
Two Aero pulverizers, Size F, having a capacity from 500-3,000 pounds coal per hour were available at another plant and were installed as the main units for each boiler.

A small unit having a capacity of 100-800 pounds coal per hour was purchased from Strong-Scott Manufacturing Company, of Minneapolis, Minn., as well as all burners and piping.

Two burners per boiler were installed. A large Strong-Scott burner was installed, set centrally. The boilers were set 15 feet from the floor line to the underside of the front header with a two-foot six-inch aircooled pit to handle ash and slag. The small burner was set nearer the side wall and below center line of the large burner in order to maintain ignition at low loads and assist in lighting off the large burner.

Lighting-off was made easy by installing a small oil burner on each boiler connected to a 275-gallon gravity tank and pressure blower.

Tests indicated that the setting of the



burners was correct which resulted in ability to operate the small burner at very low ratings.

Coal handling consists of a Jeffrey bucket elevator conveyor, taking the coal from a track hopper and discharging into a 110 ton capacity circular bunker set centrally with respect to the two boilers. The building steel was laid out so that main columns supported the boilers, roof and coal bunker, making a roomy and economically designed boiler house. The coal bunker was made of entirely welded construction using U. S. Steel Company's semi-stainless steel called Cor-ten, which reduced the structural weight about twenty-five per cent.

The water supply for this plant is very pure, analyzing as follows:

PH Value	6.9

FIGURES IN GRAINS PER GALLON

Total Solids	4.08
Volatile Matter	0.21

HYPOTHETICAL COMBINATIONS OF SOLIDS

Silica (SiO_2)	0.38
Iron Oxide and Alumina (Fe_2O_3, Al_2O_3)	0.02
Calcium Carbonate ($CaCO_3$)	1.93
Magnesium Carbonate ($MgCO_3$)	0.04
Magnesium Chloride ($MgCl_2$)	0.27
Magnesium Sulphate ($MgSO_4$)	0.68
Sodium Nitrate ($NaNO_3$)	0.31
Sodium Sulphate (Na_2SO_4)	0.22
Sulphate to Carbonate Ratio	0.48 to 1

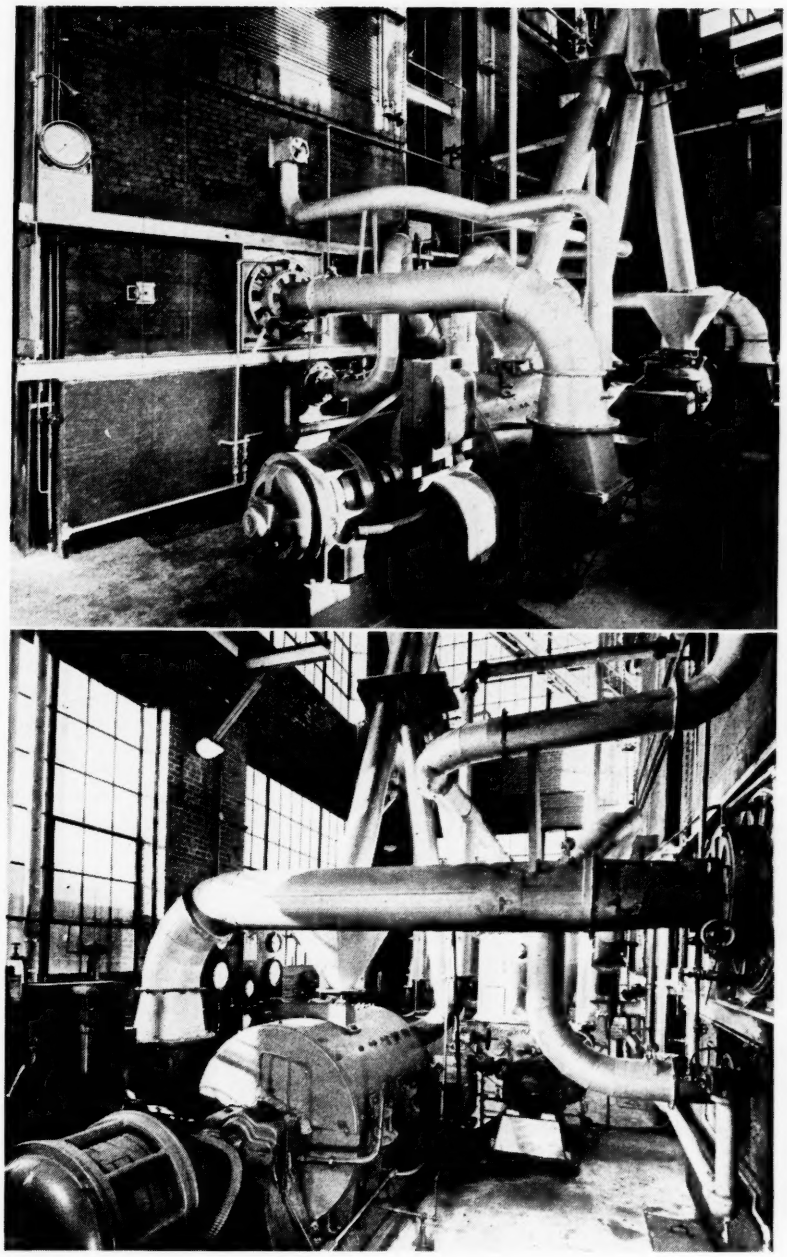
Therefore it was felt necessary to protect the boilers against dissolved oxygen. An Elliott Company's feedwater heater and storage tank was installed, the storage tank having 12 minutes supply under normal load. The feedwater heater discharges into a common header connected to two Frederick Iron & Steel Company feed pumps, one motor driven and the other driven by a Terry steam turbine so that a uniform plant heat balance could be had.

The small Strong-Scott pulverizer is driven by a 15 h.p. Terry steam turbine while the large Aero pulverizers are driven by 50 h.p. General Electric Company motors.

Control of pulverizer is by means of a Brooke Engineering Company pressure control with Brown CO-2 meters and steam flow meters all mounted on a large central control panel.

The plant was started up, tested and operated for some time on Davis Coal and Coke Company's coal, and a CO-2 of 14 per cent was easily obtained under both light and heavy loads. The furnaces being all refractory, ignition was easily maintained on low as well as high volatile coals, both of which have since been tried with good results.

Boilers are operated alternately about one month at a time when burning low ash coal and then taken off and cleaned. No ash or slag is removed during this period.



Top—Boiler room operating floor showing large and small burners with air preheater.

Bottom—View from opposite side of boiler room showing small pulverizer with control panel in background.

The entire job was handled by the Consulting Engineer, H. G. Burrill, assisted by Mr. William E. Lahm, Superintendent and Mr. H. E. Hough, Distiller at the plant.

The equipment used was as follows:

Boilers and Superheaters—Edgemoor.

Feed Water Regulators—Copes.

Feed Water Pumps—Frederick Iron & Steel Co.

Soot Blowers—Diamond Power Specialty.

Pulverizer and Burners—Aero, Foster Wheeler and Strong Scott.

Auxiliary Turbines—Terry.

Motors—General Electric Co.

Control—Brooke Engineering Co.

Meters—Brown Instrument Co.

Fire Brick—Harbisen Walker and General Refractories.

Valves and Fittings—Crane Company.

Building Steel—Acme Steel Engineering Co., Baltimore, Md.

Stack and Breeching—N. Y. Central Iron Works, Hagerstown, Md.

Coal Bunkers—MacNamara & Sons, Baltimore, Md.

A CHANGING WORLD

BY

Dr. John J. Wicker

Fork Union Military Academy,
Fork Union, Virginia

WE are in a changing world. There have been more changes in the last fifty years than in any previous five hundred. The changes not only have been very rapid but far reaching.

Twenty-five years ago two men on the east side of New York City were discussing Russia; they decided to over-throw its government. The Czar was all powerful in the Kremlin, surrounded by his army and one hundred and thirty million subjects. His empire looked safe for all time. Today communism has crowned its Dictator in that great country.

Less than twenty-five years ago there was a young Austrian about whom the world knew nothing. He was a paper hanger and painter who spent much of his time in Munich. Today, German fascism has crowned him the dictator on the throne of Emperor William. He made the greatest coup ever known without the loss of a single life when he annexed Austria. Today no man is more feared.

From the World War emerged a young Italian. He had been wounded several times but ended the war a corporal. In 1922 I was in Rome when every wheel, whether train, or carriage or cart, stopped for two hours on a national strike. A little later this corporal marched down the Piazza Venezia in Rome at the head of his own army and fascism virtually crowned Benito Mussolini, one of the greatest living personalities, supreme ruler on the throne of the Caesars.

Twenty years ago the world's greatest statesmen met in the great palace of Louis XIV where America's President and statesman announced: "We fought this war to make a future war impossible." Today, the world is at it again. Europe is threatened with annihilation.

And, said President Wilson, "We fought this war to make the world safe for democracy," yet twenty years after this statement there is less democracy than we have known for a century.

Changes have been so rapid it is impossible to penetrate the future even for a few years. Statesmen at Versaille could not do it, though they deliberated with the crown of victory from the battlefields on their brows, and with power to dictate the policies of the world.

One thing mankind must have—freedom—absolute freedom.

Tolerance is not enough. For men's heads absolute freedom is the only hat.

Rapid changes are indicative of rapid growth; and remember, people can change as quickly tomorrow as they did yesterday—maybe a little quicker.

But the world has always had its changes and this will ever be so.

A little over one hundred years ago the world was trembling under the feet of Napoleon; a few years later he had plenty of time to think it over on St. Helena—and the world moved on. This is a good sedative for our nerves today.

So it will be tomorrow and so it will ever be.

Moving, even if in somewhat the wrong direction, is healthier than standing still, for we can, at any time change our course.

The changing is only of permanent value as it lays hold on the changeless.

We can build on the past but we must not sit down on it.

Every crisis, national or international, rightly interpreted is but a larger opportunity for larger men.

Science is working miracles as never before and these miracles mean bigger minds and bigger men.

We need to prepare ourselves for the greater days lest plenty spell only prodigality.

The future problems will not be what to do with poverty but how to live in wealth.

I refuse to write pessimism on my death certificate while I am living.

A few days ago a gentleman handed me a little slip. It was folded at the bottom and fastened with a sticker with the following instructions: "Please—do not break open until you have finished reading above." It read:

"It is a gloomy moment in history. Not for many years—not in the lifetime of most men who read this—has there been so much grave and deep apprehension; never has the future seemed so incalculable as at this time. In our own country there is universal commercial prostration and panic, and thousands of our poorest fellow citizens are turned out against the approaching winter without employment, and without the prospect of it.

"In France the political caldron seethes and bubbles with uncertainty; Russia hangs, as usual, like a cloud, dark and silent upon the horizon of Europe; while all the energies, resources and influences of the British Empire are sorely tried, and are yet to be tried more sorely, in coping with the vast and deadly disturbed relations in China.

"It is a solemn moment, and no man can feel an indifference—which, happily, no man pretends to feel—in the issue of events.

"Of our own troubles (in the U. S. A.) no man can see the end. They are, fortunately, as yet mainly commercial; and if we are only to lose money, and by painful poverty to be taught wisdom—the wisdom of honor, of faith, of sympathy and of charity—no man need seriously to despair. And yet the very haste to be rich, which is the occasion of this widespread calamity, has also tended to destroy the moral forces with which we are to resist and subdue the calamity."

Having read the above, I broke open the folder, according to instructions at the bottom, and read:

"When worrying too much about today remember that the foregoing article is reprinted from *Harper's Weekly*. Vol. I, page 642, of the issue dated October 10, 1857."

"Cheer up! America is still the richest and happiest land in the world."

Some weeks ago a radio program caused people to think that the end of the world had come.

Some died of shock, others tried to commit suicide, others prayed for the first time.

One thing is certain, if we live long and live right we must have a sense of humor.

We must get possession of ourselves and when we do, then we will solve every problem of life.

IMPROVED RESIN-BONDED WOOD STRUCTURES

BY

George R. Meyercord,

President,
*Haskelite Manufacturing Company**

THE advent of plastics particularly intrigued me from the standpoint that it was one of the discoveries that would broaden the base of other industries.

The company of which I am now president pioneered in waterproof glues, primarily compounding sheets of wood into a panel form known as plywood. Our physicists and chemists have for some twenty-five years worked on this problem. As early as the beginning of the World War formed plywood canoes were produced by our company. The base of the glue at that time was blood albumen of our own formula which made possible commercially the production of molded compound-curved plywood products. This product was extensively used during the War in the aeronautical field. Blood being of animal origin was food for termites and unless the wood was well protected, particularly at the edges, glue trouble occurred. The Forest Products Laboratory did a fine job in improving casein glue (semi-waterproof) and other efforts were made to approach waterproof qualities of an enduring nature in the production of glues that would be suitable for bonding together sheets of thin wood known as veneers.

Early in the '20s we started our first tests with plastic glues. Our efforts proved successful and we adopted the phenol glue as standard in most of our products. Our reason was that phenol has more than enough strength to glue bond and is not only cold water proof but is also proof against extensive boiling of the resultant plywood, furthermore, being an inert bond, it is proof against termites.

In covering the subject of plywood, it is necessary to go beyond wood itself and combine with metal, ceramic and other basic products and show how plastics will bring about contact between wood and these other materials, how combinations of materials never heretofore sold in combination can be and are fabricated for commercial use.

After the War, it occurred to me to surface-cover plywood with sheet steel, aluminum, zinc, copper, etc.—anything produced in metal in sheet form. This brought about the problem of developing glues of an elastic nature that would allow for the different coefficients of expansion between the different metals and plywood. About the same time a large number of insulating boards appeared on the market. Some were based on wood pulp, some on bagasse, tanners' by-products, glass fibre, gypsum rock, sheet cork, etc. An endless number of sheet panels appeared having as their primary function insulating value, but being of very low structural value, they needed the facial reinforcement of metal sheets. That need also led to the application of veneers to these materials for structural purposes. It would take a week to attempt to describe the innumerable combinations and uses to which this type of panel is adapted. When metal is used, we call this product Plymetl. Its most common application is a combination of plywood faced with metal. Just to illustrate one typical application, may I say that the partitions and doors in the streamline trains Broadway Limited and Twentieth Century are plywood faced with aluminum or with steel.

*Paper read at the Franklin Institute, Philadelphia, Pa., March 12, 1940, during a meeting sponsored by the Bakelite Corporation.

George R. Meyercord beside a Fairchild Duramold airplane fuselage. Note the formed piece of plywood several inches thick which it is practical to make in sufficient size for the formation of a large lifeboat in one piece.

Where extreme protection against fire hazard is essential, we bond a thin sheet of asbestos within the body of the plywood panel. The glue would be phenol plastic, and being in itself inert, has substantial fire-resistant value. To illustrate the use to which such panel is put, I might say that the stateroom partitions in the steamships Washington and Manhattan are made of this combination.

During the World War and for some time thereafter plywood was the structural panel used in making most of the world's airplanes. In some exposed parts of the plane, however, metal superseded the wood.

DURAMOLD

Upon the entry of the United States into the World War in 1917, our company came into contact with Colonel Virginius E. Clark, then in charge of airplane engineering development at the Army Field in Dayton. Colonel Clark designed some airplanes, the chief feature of which was the moulding of a streamline fuselage. A

(*Continued on page* 58)

AMERICAN METAL WORKING MACHINERY EXPORTS

TOPPING $100,000,000 for the second successive year, American metal-working machinery exports totaled $117,473,885 in 1939, a 16 per cent increase over the 1938 shipments valued at $101,656,830, according to the Machinery Division, Department of Commerce. While shipments were made to practically all foreign countries during the year, the trade remained highly concentrated, with four countries, United Kingdom, Japan, France, and Soviet Russia receiving 81 per cent of the total.

Some measure of the steady and unprecedented foreign demand for American metal-working machinery in recent years is provided by a review of past figures on the trade. In 1929 the value of metal-working machinery exported from the United States was $40,804,000, but the trade dropped steadily thereafter to the low point of $9,369,000 in 1933. This was the turning point in the down-swing, however, and the steady recovery in foreign demand enabled American producers to recover fully the ground lost by the end of 1936, and to push their shipments abroad to record levels during the succeeding three years. This export business has been extremely important to American metal-working machinery builders, as the domestic demand for their products was relatively low and unsteady during these years. Export orders amounted to a large share of their total business, and made it possible for them to keep their plants and working forces much more fully employed than would otherwise have been possible. In addition, the industry was in a much better condition to meet the sharp increase in both domestic and foreign orders following the outbreak of war in Europe. Despite their improved position in this respect, delivery dates on such orders have had to be increasingly lengthened as a result of the heavy wave of buying.

The sharp rise to record levels of American metal-working machinery exports began with large purchases by two countries, United Kingdom and Russia, in 1936. These countries continued to buy heavily in the United States, while in 1937 Japan and France also began to place large orders with American producers.

From $5,450,722 in 1935, our exports of metal-working machinery to the United Kingdom jumped to $11,793,291 in 1936, increased again to $19,870,465 in 1937, dropped slightly in 1938 to $15,231,265, and more than doubled in 1939 to $33,163,525. The corresponding shipments to Russia were valued at $6,426,750 in 1935, $15,382,516 in 1936, $6,953,927 in 1937, and $35,162,867 in 1938, but dropped to $18,669,009 last year. The exports to Japan advanced from $3,436,280 in 1936 to $12,151,886 in 1937, $23,811,408 in 1938, and $24,839,240 in 1939. French buyers did not enter the market heavily until 1939, our exports to France advancing from $4,947,293 in 1937 to $5,701,689 in 1938, and to $18,806,438 in 1939. As previously mentioned, these four countries accounted for 81 per cent of our total exports of metal-working machinery during 1939. Our next best foreign market in 1939 was Canada, taking shipments valued at $6,412,777 compared with $5,058,246 in 1938.

Most types of metal-working machinery participated in the increased shipments in 1939 compared with 1938. Lathes valued at $17,418,029 were shipped abroad during 1939, representing an 18 per cent gain over the 1938 exports valued at $14,807,474. Shipments of the turret type advanced by 25 per cent for the year, to $7,485,976 from $5,986,030 in 1938. The exports of engine lathes declined slightly, to $6,532,765 from $6,649,907. Other type lathes were exported during the year to the value of $3,399,288, a 57 per cent advance over the corresponding shipments in 1938 valued at $2,171,537.

The exports of vertical boring mills and chucking machines advanced by 45 per cent in 1939, to $5,248,354 from $3,628,106 in the preceding year. Thread cutting and automatic screw machine shipments were up 27 per cent for the year, $5,604,647 compared with $4,408,770. Total shipments of knee and column type milling machines amounted to $6,688,770, 44 per cent above the 1938 figure of $4,629,144. The exports of all other types of milling machines totaled $12,563,448, a 26 per cent gain over the 1938 trade valued at $9,955,304.

81 Percent of Shipments Go to 4 Countries-United Kingdom, Japan, France and Soviet Russia.

Other items in which substantial increases were recorded during 1939 over 1938 included: Gear cutters, $3,988,148 against $3,106,344; vertical drilling machines, $1,372,190 against $997,907; radial drilling machines, $977,377 against $872,184; planers and shapers, $4,020,389 against $2,794,302; internal grinders, $4,338,865 against $4,000,109; tool cutter, and universal grinding machines, $3,887,041 against $3,268,048; other grinding machines, $11,883,399 against $10,278,571; forging machinery, $4,749,847 against $3,966,814; chucks for machine tools, $331,238 against $300,878; milling cutters, etc., $804,467 against $627,972.

Exports of rolling mill machinery dropped off slightly in 1939 to $10,010,608 from $10,057,889 in 1938, while a sharper loss was recorded in foundry and molding equipment, $1,222,721 against $1,948,697.

Two salesmen had the same idea!

ONE OF THEM SAID:

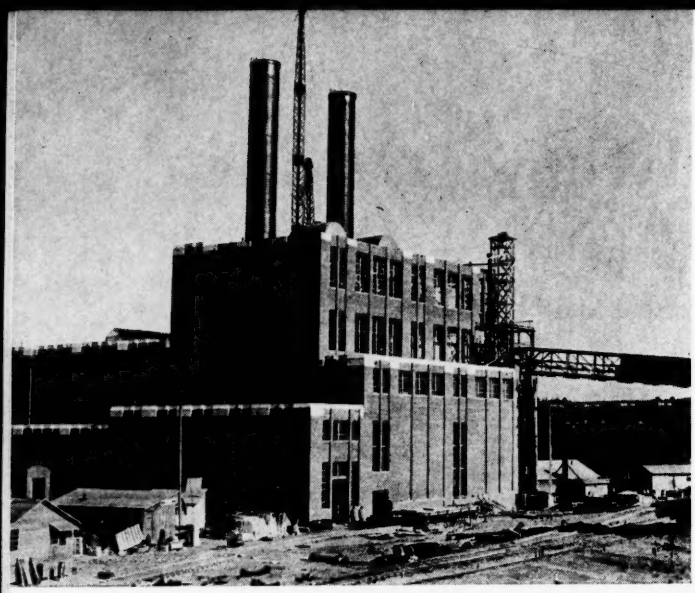
"I'll try to remember to mention that to Brown Brothers when I get around to their town next week."

THE OTHER ONE SAID:

"Here's a telephone booth. I'll call Bill Brown right now!"

Which salesman will need a new order book first?

Alert, successful salesmen today do much effective traveling *by telephone.* . . . They keep in *personal* touch with customers between trips, pass on suggestions, report price changes, pick up new leads and extra orders. They telephone ahead to the next town for time-saving appointments. They use Long Distance in dozens of ways—*because it pays!*



INDUSTRIAL CONSTRUCTION FORGES AHEAD

Duke Power Company's $10,000,000 power plant at Cliffside, N. C., is shown above, as it approaches completion scheduled early in June. The 120-foot high building —as tall as an 11-story structure—houses two 50,000-horse-power units with a generating capacity of 80,000 kilowatts. The adjacent coal storage yard can hold 120,000 tons of coal, which will be consumed at the rate of 37 tons per hour. Another big Duke project is under way at Salisbury, N. C., where an addition is being made to the company's Buck plant.

THREE months of Southern construction have resulted in totals showing private industrial work steadily forging ahead, as all other types both private and public dropped slightly below the levels set during the comparable period of 1939. Industrial construction placed in the contract stage during the current first quarter has represented, in fact, a substantial stabilizing factor.

While the $186,814,000 total of all contracts placed so far this year is about ten per cent below the $207,868,000 of the similar three months of last year, private industry's direct contribution to the 1940 figure in the form of plant construction is $53,078,000, or almost four times the $15,868,000 of such contracts at this time last year.

Private investment in industrial and building construction is now higher than at any time since last October.

The month of March contracts awarded in the sixteen Southern States, footed up $62,239,000, as tabulated from the *Construction* daily bulletin. This was a decrease from both the $65,313,000 of the preceding month and the $72,134,000 of March 1939.

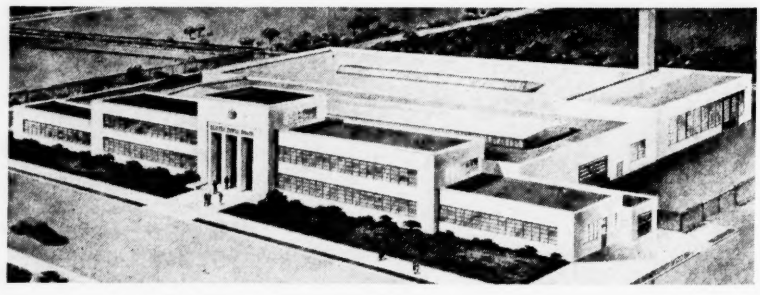
Included in March's total are private industrial contracts of $23,767,000. Several important plant projects reached the contract stage, according to announcements made during the month. One will utilize products from the South's forests; the other will extract a metallic element from the waters that wash the South's extensive coastline.

This extraction plant is the second similar enterprise to be established in the South by the same interests. It will remove magnesium from the Gulf of Mexico where it touches the Texas shore at Freeport. Its cost is reported in the neighborhood of $5,000,000 and the contract for its construction has been awarded by the Dow Chemical Co. to the Austin Co., of Cleveland. A Dow affiliate now has a plant at Kure Beach, N. C., for taking bromine from the Atlantic Ocean.

Flintkote Co., nationally known building material manufacturing concern, made the other important Southern industrial award, which went to the Rust Engineering Co., of Pittsburgh. A $2,000,000 factory will rise from a recently acquired

Statistics of South's Construction

	March, 1940		First Three Months 1940
	Contracts Awarded	Contracts to be Awarded	Contracts Awarded
PRIVATE CONSTRUCTION			
BUILDING			
Assembly (Churches, theatres, auditoriums, fraternal)	$945,000	$2,343,000	$3,170,000
Commercial (Stores, restaurants, filling stations, garages, etc.)	2,609,000	3,099,000	7,270,000
Residential (Apartments, hotels, dwellings)	6,485,000	7,771,000	18,790,000
Office	738,000	1,569,000	1,606,000
	$10,777,000	$14,782,000	$30,836,000
INDUSTRIAL	$23,767,000	$35,033,000	$53,078,000
PUBLIC CONSTRUCTION			
BUILDING			
City, County, State, Federal	$6,033,000	$16,604,000	$23,060,000
Housing	4,545,000	14,704,000	23,886,000
Schools	1,804,000	5,729,000	4,360,000
	$12,382,000	$37,037,000	$51,306,000
ENGINEERING			
Dams, Drainage, Earthwork, Airports	$5,542,000	$33,343,000	$11,774,000
Federal, County, Municipal Electric	1,559,000	4,748,000	7,020,000
Sewers and Waterworks	619,000	9,434,000	2,190,000
	$7,720,000	$47,525,000	$20,984,000
ROADS, STREETS AND BRIDGES	$7,593,000	$33,032,000	$30,610,000
TOTAL	$62,239,000	$167,409,000	$186,814,000



J. J. McDevitt Co., Charlotte, N. C., the lowest at $242,930 among seven bidders, received the contract to erect the brick distribution service building at Chattanooga, Tenn., for the Electric Power Board (right). Fronting 320 feet on Oak Street, the structure will extend back 190 feet on a 7-acre site purchased for development as a center of distribution and operation department activities. The contract calls for completion by August 31. R. H. Hunt & Co., Chattanooga, architects, prepared the plans.

site at Meridian, Miss. A complete line of wood fibre decorative and structural insulation and wall board products will be turned out at the rate of 65,000,000 square feet a year. More than 100 carloads of highly specialized felting and processing machinery will be installed. Operation of the plant will require 300 workers.

These two undertakings, as well as many others exemplify the growth of the Chemical South, both present and potential. DuPont's reported proposal to locate two $500,000 powder plants in Tennessee would add considerably to that company's operations in the State, where surveys are reported to be under way for a third new DuPont plant to supplement the great nylon producing plant at Seaford, Del., just across the Maryland line.

Additions to the South's chemical manufacturing are proposed at other widely separated points. Rio Grande By-Products Corp. plans a $500,000 plant at McAllen, Tex. Solvay Process Corp., Hopewell, Va., is starting preliminary work on an addition to increase its ammonia division's capacity from 15 to 18 per cent. International Nickel Co. will spend $125,000 for enlarging laboratories and electrolytic tanks at Huntington, W. Va.

Republic Steel Corp. announced a program reported to involve millions for increasing the capacity of its wide plate mill at Gadsden, Ala., by installation of an additional slab heating furnace, construction of a warehouse addition and an extension for mesh-making. Chesapeake & Potomac Telephone Co., Baltimore, made the important award in the communication field. Cummins Construction Corp. received the contract for a $1,000,000 building under the C. & P. $5,000,000 program for the Monumental City.

Two aircraft factories are being proposed—one at San Antonio, Tex., and the other at an unannounced location. National Aircraft Corp. is preparing to erect the Texas factory. Frank M. Bellanca, president of the Bellanca Aircraft Manufacturing Corp. of Mexico is reported to be seeking the site for the other, involving $500,000. Mobile, Ala., and Biloxi, Miss., have been considered.

Projects in the gas and oil industry include a $1,000,000 solvent dewaxing unit to be built at Houston, Texas, by Lummus Co. for Sinclair; and a recycling plant to process 100 million cubic feet of gas daily, to be constructed near Agua Dulca, Tex., by Stearns-Roger Manufacturing Co. for the Gulf Plains Corp.

Doyle & Russell, Richmond contractors, early in the month were reported as receiving the $350,000 foundation and building contract for the $2,000,000 Alexandria, Va., steam generating plant of the Virginia Public Service Co. Toward the close of March, the announcement was made from Washington that the National Power Policy Committee had developed plans for a 2,500-mile network of transmission lines to connect strategic munitions manufacturing centers east of the Mississippi River.

Two Southern areas are mentioned in the plan. These are Baltimore-Washington and St. Louis, Mo., where generating plant additions are already under way. A huge addition to the Consolidated Gas Electric Light and Power Company's facilities costing $8,100,000 is now going forward at Baltimore. Union Electric Co. is launching $1,600,000 improvements at its St. Louis generating and steam plant. Potomac Electric Power Co., Washington, is adding a 50,000-kilowatt unit at Buzzard Point, cost estimated over $5,000,000.

Other power expansions are taking place farther South. Among these are the $10,000,000 Cliffside project now being completed in North Carolina by Duke Power Co., which is carrying work ahead on an $8,000,000 addition to its Buck plant, near Salisbury; two Commonwealth and Southern projects—the one for the Georgia Power Co., at Macon, Ga., and the other for the Alabama Power Co., at Mobile, Ala., each involving around $4,000,000; Florida Power & Light Company's $3,000,000 Dania project; Eastern Shore Public Service Company's $1,000,000 extension at Vienna, Md.; a $2,300,000 addition to the Canal station of the Louisville Gas & Electric Co., Louisville, Ky., affiliate of the Standard Gas & Electric system. The addition to the Twelfth Street power plant of the Virginia Electric & Power Co., Richmond, has just been completed.

Southern Construction

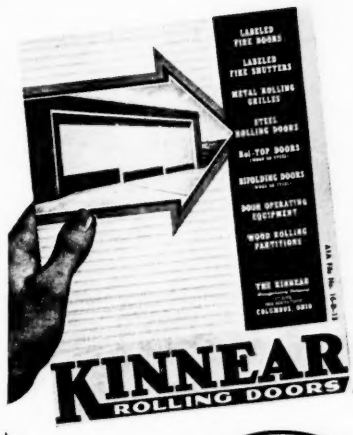
(By States)

	March, 1940 Contracts Awarded	March, 1940 Contracts to be Awarded	First Three Months 1940 Contracts Awarded
Alabama ..	$1,692,000	$9,841,000	$6,263,000
Arkansas .	2,144,000	2,204,000	4,795,000
Dist. of Col.	1,349,000	8,602,000	10,289,000
Florida ...	10,191,000	8,184,000	22,711,000
Georgia ...	2,880,000	18,130,000	10,313,000
Kentucky .	1,236,000	2,250,000	7,485,000
Louisiana .	6,085,000	4,534,000	16,575,000
Maryland .	5,845,000	5,690,000	13,412,000
Mississippi.	2,906,000	4,606,000	8,077,000
Missouri ..	5,238,000	7,652,000	12,328,000
N. Carolina	1,814,000	3,615,000	4,769,000
Oklahoma .	222,000	8,104,000	5,097,000
S. Carolina	789,000	1,895,000	4,392,000
Tennessee .	1,659,000	25,958,000	14,963,000
Texas	12,225,000	48,743,000	29,577,000
Virginia ..	4,374,000	5,419,000	9,820,000
W. Virginia	1,590,000	1,982,000	5,948,000
TOTAL .	$62,239,000	$167,409,000	$186,814,000

Industrial

(Industrial, Electric Railways, Railroads, Buses, Telephones, Docks, Steamships)

	March, 1940 Contracts Awarded	March, 1940 Contracts to be Awarded	First Three Months 1940 Contracts Awarded
Alabama ..	$300,000	$3,255,000	$2,560,000
Arkansas .	1,115,000	295,000	2,847,000
Dist. of Col.	295,000	.....	329,000
Florida ...	5,261,000	155,000	5,599,000
Georgia ...	220,000	95,000	670,000
Kentucky .	25,000	150,000	2,550,000
Louisiana .	160,000	735,000	2,319,000
Maryland .	2,107,000	967,000	2,414,000
Mississippi.	2,390,000	95,000	2,434,000
Missouri ..	307,000	235,000	697,000
N. Carolina	507,000	800,000	820,000
Oklahoma .	28,000	200,000	3,028,000
S. Carolina.	420,000	212,000	2,085,000
Tennessee.	811,000	23,637,000	8,453,000
Texas	6,914,000	2,758,000	9,106,000
Virginia ...	1,610,000	447,000	2,516,000
W. Virginia	1,297,000	997,000	4,651,000
TOTAL .	$23,767,000	$35,033,000	$53,078,000



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ROLLING DOORS

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When you look through this new 1940 catalog, you'll quickly see why Kinnear Rolling Doors are so often specified by industry. And you'll want to have it on hand before installing service door equipment in your plant.

Kinnear Rolling Doors are built in various types, to fill every requirement—but they all operate upward, storing easily, rapidly and conveniently in useless space above the opening. They save valuable floor and wall space, and open completely out of the way of damage by trucks or wind. They are built by door specialists for heavy-duty commercial and industrial service. They stand up under hard, daily use, as proved by records of many Kinnear Doors that have given more than thirty years of dependable, continuous service. Whether for service or fire protection, you'll find Kinnear Doors a real investment. Built to fit any opening. Easy and economical to install, with motor, manual, or mechanical operation.

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KINNEAR MFG. CO.

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Columbus, Ohio

Please send me the new 1940 Kinnear Catalog.

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STREET .....

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New Industrial Plants and Expansions in the South During March 1940

Ala., Andalusia—Alabama Textile Products Corp.; building .
Ala., Gadsden—Republic Steel Corp.; plant additions.....
Ala., Mobile—Gulf, Mobile & Ohio Rwy.; hopper & box cars $2,500,000
Ala., Tarrant City—Southern Bell Telephone & Telegraph Co.; building .....

Ark., Helena—Arkansas Utilities Co.; equipment installation 10,000
Ark., Jonesboro—Union Baking Company; plant 12,000
Ark., Pine Bluff—Louisiana & Arkansas Rwy.; equipment.. 1,500,000

D. C., Washington—Chesapeake & Potomac Telephone Company; building 270,000

Fla., Coral Gables—Renuart Lumber Yard, Inc.; warehouse
Fla., Fort Myers—Dixie Pontiac Co.; garage & display room
Fla., Miami—Howard Preserving Co.; plant .....
Fla., Miami—Pepsi-Cola Bottling Co.; plant .....
Fla., Miami—Seaboard Air Line Rwy.; warehouse & auto platform .....
Fla., Pensacola—Armstrong Cork Co.; building .....
Fla., Pensacola—Frisco Lines; warehouse extension 14,000
Fla., Port St. Joe—Southeastern Pipe Line Co.; pipeline....

Ga., Atlanta—Transport Realtor Co.; freight terminal.....
Ga., Atlanta—R. M. Vandergriff; dry cleaning plant .....
Ga., Augusta—Snows Laundry; laundry 25,000
Ga., Barnesville—Barnesville Planing Mill Co.; addition .. 30,000
Ga., Macon—Macon Textile Co., building .....
Ga., Marietta—Economy Ice Cream Co.; plant .....
Ga., Marietta—B. G. Hunt; plant 25,000
Ga., Plains—Thad M. Jones (Plains Telephone Co.); improvements 10,000

Ky., Lexington—Dr. J. C. Carrick; building 50,000
Ky., Middlesboro—Martin Brothers; building .....

La., Alexandria—Southern Bell Telephone & Telegraph Co.; building .....
La., Bogalusa—Gaylord Container Corp.; factory addition & office 40,000
La., Hammond—Marion T. Fanally; cold storage plant ....
La., Lake Charles—Wackman Welded Ware Co.; plant 50,000
La., Marrero—Celotex Corporation; warehouse .....
La., Natchitoches—Natchitoches Coca-Cola Bottling Co.; plant 50,000
La., New Orleans—Mid-State Realty Co., Inc.; bus terminal
La., New Orleans—Southern Bell Telephone & Telegraph Co.; building .....
La., New Orleans—Standard Oil Co. of Louisiana; oil service station .....
La., New Orleans—Trailways Terminal; bus terminal ....

Md., Baltimore—Baltimore & Ohio R. R.; hopper, gondola & box cars 5,929,000
Md., Baltimore—John Jeppi; service station .....
Md., Baltimore—Owens-Illinois Can Co.; storage building
Md., Baltimore—Sherwood Brothers; service station .....
Md., Baltimore—Oscar T. Smith, Jr.; lithographing plant
Md., Baltimore—Standard Oil Co.; servicenter .....
Md., Bel Air—Consolidated Gas, Electric Light & Power Co.; building .....
Md., Sparrows Point—Rheem Mfg. Company; building ....

Miss., Collins—Standard Oil Co.; filling station .....
Miss., Jackson—Flint Jordan Construction Co. (contractor); garage 88,000
Miss., Jackson—Union Producing Co.; steel tank .....
Mo., Kansas City—Butler Mfg. Company; building .....
Mo., Kansas City—Canada Dry Ginger Ale, Inc.; plant 200,000
Mo., St. Louis—The Blanton Company; plant, office, refinery building .....
Mo., St. Louis—Columbia Brewing Co.; office & warehouse
Mo., St. Louis—Emerson Electric Mfg. Co.; plant addition
Mo., St. Louis—J. H. R. Investment Co.; service building
Mo., St. Louis—Marquette Cement Mfg. Co.; unloading dock 20,000
Mo., St. Louis—Monsanto Chemical Co.; warehouse 24,000
Mo., St. Louis—Seco Sales Corp.; plant 25,000
Mo., St. Louis—Southwestern Bell Telephone Co.; exchange addition .....
Mo., St. Louis—Wabash Railway; improvements & betterments 258,868

North Carolina—Dare Corporation; industrial & agricultural development .....
N. C., Belmont—Dixon Motor Company; garage .....
N. C., Charlotte—Charlotte Big Boy Bottlers, Inc.; buildings & equipment 40,000
N. C., Charlotte—Gary Beverage Company; plant .....
N. C., Charlotte—General Dyestuff Corp.; office, laboratory, warehouse .....
N. C., Charlotte—Lance Packing Co.; addition 107,000
N. C., Draper—Marshall Field & Co.; plant repairs & new warehouse .....

N. C., Durham—Durham Telephone Co.; substation 125,000
N. C., Fairmont—A. E. Hudson; canning plant installation
N. C., Greensboro—Burlington Mills Corp.; textile mill ....
N. C., Henderson—Vance Hosiery Mills, Inc.; building ....
N. C., Mount Airy—Hugh Gray; hosiery mill 200,000
N. C., Pittsboro—J. M. Odell Mfg. Co.; hydro-electric plant
N. C., Swannanoa—Beacon Mfg. Company; addition .....
N. C., Wilmington—J. W. Jackson; bottling plant .....

Okla., Newkirk—Newkirk Cooperative Elevator & Supply Co.; elevator .....
Okla., Tulsa—Barnes-Manley Laundry; improvement program 15,000
Okla., Tulsa—Guaranty Laundry & Dry Cleaners; fur cold storage building .....
Okla., Tulsa—Nash Finch Company; building & equipment 45,000
Okla., Tulsa—Charles A. Stoffer; auto springs plant .....

S. C., Charleston—Seaboard Air Line Rwy.; wharf, warehouse 65,000
S. C., Greenville—W. D. Dodenhoff Co.; factory .....
S. C., Greenville—Pepsi-Cola Company; building 30,000
S. C., Seneca—Singer Sewing Machine Co.; plant .....
S. C., Spartanburg—Springdale Dairy; plant 12,000
S. C., Westminster—Oconee Mills; addition .....

Tennessee—E. I. du Pont de Nemours & Co., Inc., two plants 1,000,000
Tenn., Clarksburg—S. F. Ringold & J. P. Jones; clay mine plant 100,000
Tenn., Knoxville—Southern Bell Telephone & Telegraph Co.; expansion program 766,386
Tenn., Memphis—American Finishing Co.; office addition 12,000
Tenn., Memphis—Nickey Brothers Lumber Co.; mill 200,000
Tenn., Nashville—Anthony Pure Milk Co.; plant addition
Texas—Gulf Plains Corporation; recycling plant .....
Tex., Austin—L. Rankine; ice plant .....
Tex., Austin—Shults Brothers; bakery .....
Tex., Beaumont—Beaumont City Lines; bus terminal 50,000
Tex., Beaumont—Socony-Vacuum Oil Co.; reforming & thermal polymerization unit .....
Tex., Brenham—Southwestern Bell Telephone Co.; telephone system & building 80,000
Tex., Brownsville—Hausman Packing Co.; plant 25,000
Tex., Bryan—Eagle Print Company; plant .....
Tex., Fort Stockton—Fort Stockton Pioneer; plant .....
Tex., Freeport—Dow Chemical Co.; plant .....
Tex., Galveston—Graugnard's Bakery, Inc.; bakery .....
Tex., Galveston—Magnolia Petroleum Co.; oil station ....
Tex., Galveston—Southwestern Bell Telephone Co.; line extension 13,000
Tex., Harlingen—Hygeia Milk Products Co.; cold storage building .....
Tex., Houston—Brochstein, Inc.; store fixture plant 125,000
Tex., Houston—J. A. Folger & Co.; plant addition 60,000
Tex., Houston—Gulf Oil Corporation; filling station 20,000
Tex., Houston—Houston Industrial Power Co.; power plant 30,000
Tex., Houston—Humble Oil & Refining Co.; service station 10,000
Tex., Houston—Hydril Company of Texas; warehouse addition & pipe rack 35,000
Tex., Houston—Earle C. Parker; uniform manufacturing plant .....
Tex., Houston—John T. Shea; service building 12,000
Tex., Houston—Shell Oil Company; service station .....
Tex., Houston—Sinclair Oil Refinery; plant unit 1,000,000
Tex., Houston—Southwestern Bell Telephone Co.; garage.. 25,000
Tex., Houston—Southwestern Bell Telephone Co.; two exchanges 200,000
Tex., Mercedes—Missouri Pacific Railroad Co.; packing plant .....
Tex., Robstown—Southwestern Associated Telephone Co.; exchange building 15,000
Tex., San Antonio—Better Home Ice Cream Co.; plant ....
Tex., San Antonio—National Aircraft Corp.; factory unit
Tex., Sherman—Muenster Refining Company; gas station ..
Tex., Texas City—Pan-American Refining Corp.; polishes mfg. plant .....
Tex., Yorktown—Yorktown Union Gin Co.; rebuilding of plant .....

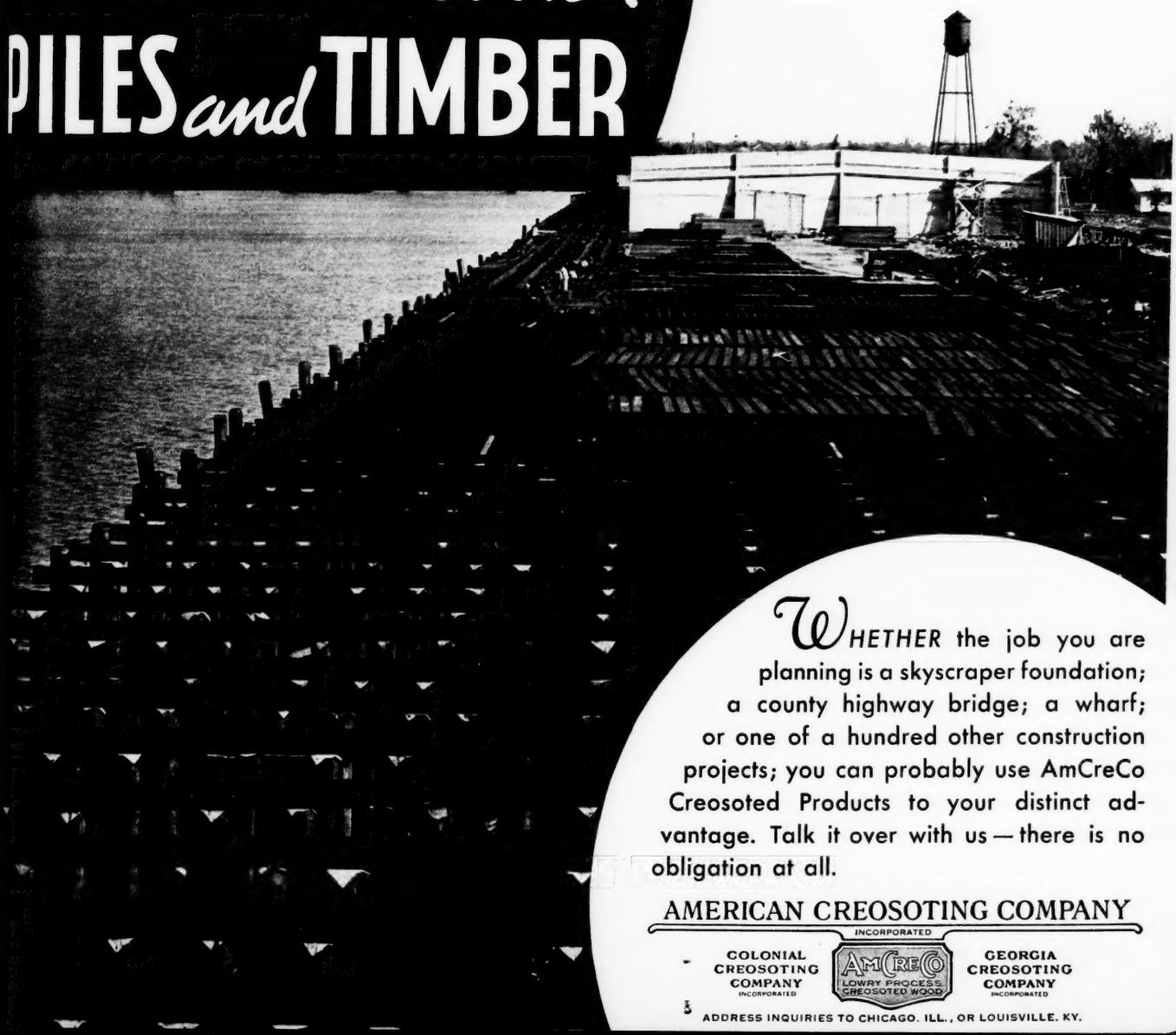
Va., Alexandria—Virginia Public Service Co.; generating plant building 350,000
Va., Hopewell—Solvay Process Company; addition .....
Va., Luray—Schwarzenbach Huzer Co.; textile plant .....
Va., Lynchburg—Craddock-Terry Shoe Corp.; building .. 30,000
Va., Celco—Celanese Corp. of America; building & machinery installation .....
Va., Richmond—Firestone Service Stations; service station 16,275
Va., Roanoke—Pitzer Transfer Company; garage 15,000
Va., Vinton—Burlington Mills Corporation; addition ....

W. Va., Huntington—International Nickel Co.; plant improvements 125,000
South—Bellanca Aircraft Manufacturing Corp. of Mexico; plant 500,000

BE SURE *of these* 3 ADVANTAGES *in your construction materials—*

- LONG LIFE
- ECONOMY
- RELIABILITY

AMCRECO *Pressure Creosoted* PILES *and* TIMBER



WHETHER the job you are planning is a skyscraper foundation; a county highway bridge; a wharf; or one of a hundred other construction projects; you can probably use AmCreCo Creosoted Products to your distinct advantage. Talk it over with us — there is no obligation at all.

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New Ways of Doing Things

Small Maintenance Roller

Designed to fill a need for a small roller which may be handled the same as the conventional 3-wheel type, the Ferguson Maintenance Roller has been introduced by the Shovel Supply Company of Dallas, Texas, manufacturers and distributors of contractors' supplies and equipment. This new unit, it is claimed, provides perfect safety for the operator, maintains the same pressure per inch of roll as a ten-ton roller, and is quickly and completely portable.

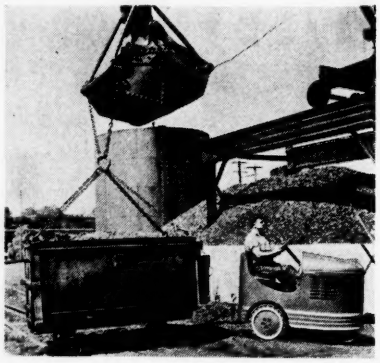
Ferguson Maintenance Roller

The large cast iron front roller—32 inches in diameter and 24 inches on the face—provides a pressure of 152 pounds per inch of roll. The unit is controlled with worm and gear steering wheel acting directly on the small front roller which is made in two halves for easy steering. Power is provided by a 6-horsepower air-cooled Wisconsin engine, driving through two speed transmission and floating plate clutch, the final drive being through steel cut sprockets and roller chain to the large roller, with speeds of 1¼ and 2½ miles per hour.

For moving from one job to another, large pneumatic roller bearing wheels are lowered by means of self-locking jack screws, actuated by a convenient crank at the front of the machine. The trailing tongue, carried in loops on the side of the roller, is then inserted and the roller is ready to trail behind a light truck at 50 miles per hour. Since the operator rides and steers the roller, he is removed from the danger of passing traffic and has full vision of the work to be done. The roller may be turned in a small radius, making it particularly suitable for state highway or city maintenance work, and will operate for 10 hours on 5 gallons of gasoline. Both rollers are provided with self-adjusting scrapers and cocoa mats which are kept wet from a large tank in the hood of the roller, thus preventing material from sticking to the rolls. In addition to highway and city work, the roller is particularly adaptable for small paving operations such as driveways, docks, factory and warehouse floors, and similar work.

"Clarkat" Industrial Tractor

Streamlined in harmony with modern design trends and steel turreted to afford complete driver protection, the new "Clarkat" industrial tractor, introduced by Clark Tructractor Division of Clark Equipment Company, Battle Creek, Mich., was designed for rapid and economical transfer of raw materials, parts and finished goods from one department to another. The machine is capable of pulling 25 tons on trailers and is so compact that it threads crowded aisles easily, passes through narrow doorways and operates on congested platforms. Stability is provided by twin wheels at the bow which assist the tractor in negotiating rough roadways. The driver is comfortably and safely seated within a heavy ½-inch steel body and has clear vision of his load and right-of-way. Power is provided by a Continental Red Seal motor. The machine has an overall width of 38¼ inches, 57-inch turning radius, and speed of 8 miles per hour. The company also announces another model for use on damp and slippery factory floors and steel ramps, and for pushing extra heavy objects into position. It pulls 40 tons on trailers.



Modern Press With Many Sides

Of exceptionally sturdy steel construction with a frame properly reinforced to give the maximum amount of rigidity, the Elmes General Purpose Open Side Hydraulic Press is described by the manufacturers as "the result of modernization and numerous minor improvements." The bed is located at a conveniently working height from the floor and is provided with slots for fastening jigs or fixtures. The moving platen is accurately guided on adjustable gibs on the frame, while T-slots are also provided in the moving platen. Control equipment is in the housing and the press is operated by a single lever. Adjustments may be made by opening a hinged cover in the rear. The press is manufactured by Charles F. Elmes Engineering Works, Chicago, Ill.

Outside Valve Doenut Tires

The Musselman Products Company of Cleveland, Ohio, announces a new line of Doenut tires and wheels featuring an outside valve instead of the conventional type in the center of the tire and projecting through the rim. The new valve is entirely outside the rim and does not contact it at any point. Located so as to be free from rubbing or scraping damage, the valve stem is of short rubber construction. Punctures are repaired without removing the tire from the wheel. An important feature of the outside valve Doenut is that it completely eliminates valve damage caused by "creeping" from running tires under-inflated. The units are built in three sizes—10″ x 2.75″; 12″ x 3.30″, and 16″ x 4.40″.

CP Reversible Wrenches

The Chicago Pneumatic Tool Company, New York City, is introducing its new No. 365-R and No. 375-R reversible wrenches which are particularly useful in refineries, in railroad shops and for removing and applying staybolt caps, dome nuts, smoke box nuts, cylinder and valve chamber head nuts, front end nuts, washout plugs, structural steel work, cracking still work, shipbuilding work, etc. Features of the wrenches are: no gears, springless driving unit, short overall length, tapered nose end, slow-speed rotary motor, and ease of handling. The CP 365-R Power Vane Wrench, for which patent is pending, is light in weight, weighing only 27½ pounds net, while its overall length is 16¼ inches. The No. 375-R Wrench is practically the same as the No. 365-R unit, except that it has a larger capacity, with a net weight of 61 pounds and an overall length of 21¼ inches.

CP 365-R Power Vane Wrench

The Arundel Corporation

BALTIMORE, MD.

Dredging—Construction—Engineering

Distributors of Sand - Gravel - Stone and Commercial Slag

A COMPLETE ORGANIZATION

Our complete organization with years of experience in successfully executing large construction contracts of various kinds is prepared to undertake the construction of earth, masonry and concrete dams, drydocks, dredging of all kinds, river and harbor improvements, deepening channels, hydraulic filling and rock work, tunnels, railroad construction, sewers and waterways.

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W. BLADEN LOWNDES, Vice-President
JOSEPH N. SEIFERT, Secretary & Asst. Treas.
E. L. WADE, Assistant Secretary
T. K. SHAUGHNESS, Assistant Secretary
C. WARREN BLACK, Vice-President in Charge of Engineering and Construction
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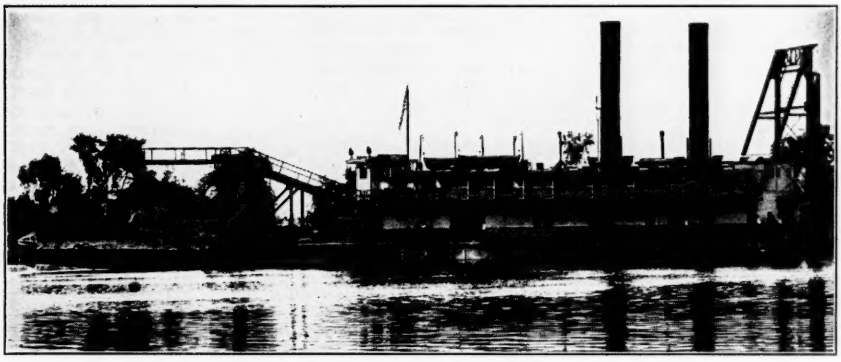
BALTIMORE, MD.

Branches: BROOKLYN, N. Y.—MIAMI, FLA.

DREDGING

FILLING, LAND RECLAMATION, CANALS, PORT WORKS

RIVER AND HARBOR IMPROVEMENTS—DEEP WATERWAYS AND SHIP CHANNELS



We are especially equipped to execute all kinds of dredging, reclamation and port works in Southern waters.
Correspondence invited from corporate and private interests everywhere.

Contractors to the Federal Government

ATLANTIC GULF AND PACIFIC CO.

NEW YORK: 15 Park Row **HOUSTON, TEXAS: Scanlan Building**

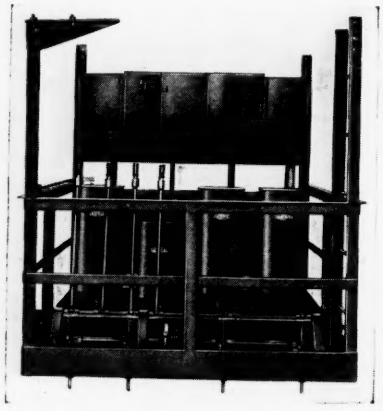
NEW WAYS OF DOING THINGS

Nickel and Chrome Plated Aluminum Sheets

Two new products—Nickel Aluminum and Chrome Aluminum Sheet—developed by the American Nickeloid Company, Peru, Ind., are now being offered to industry for the first time. These new metals consist of surfaces of pure nickel or chromium bonded to an aluminum base. They are available in sheets 24 inches by 96 inches to 36 inches by 96 inches in gauges from .010 inch to .0625 inch, in a full range of tempers. Described as beautiful, economical, durable and workable, the sheets come in bright and satin finishes, and in striped, crimped and corrugated patterns.

Modern P&H Crane Cab

Claimed to provide the utmost in efficiency while eliminating at the same time many sources of danger, a new P&H crane cab introduced by the Harnischfeger Corporation of Milwaukee, Wis., is equipped with drum-type controllers fully enclosed, while all wiring is in conduit with junction boxes, and in accordance with Underwriters' rules. The sectional panel switchboard has inverse time overload



P&H Crane Cab Provides Efficiency and Eliminates Dangers

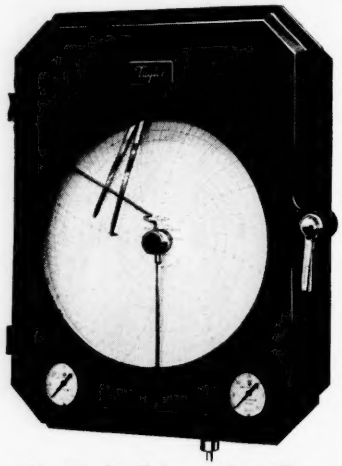
relay protection, all steel cabinet enclosure. Doors are hinged for ready access, and when the door is open the safety-type main switch is inoperative. In addition to the hydraulically-operated foot brake, there is a mechanical brake for any emergency that might arise. To guard against slipping or falling, there is a toe angle guard at least 6 inches high, and for further protection there is a warning foot gong. The front operating levers are closely spaced and easy to manipulate, providing a convenient grouping of the operating handles. The hook and load is in constant sight of the operator.

Redler Conveyor Eliminates Contamination

In a new Redler Conveyor recently introduced by Stephens-Adamson Manufacturing Company, of Aurora, Ill., absolute cleanliness and freedom from contamination are assured, according to the manufacturers. The new unit is available in the Horizontal Closed Circuit type Redler and features the driving chain moving in a compartment separate and distinct from the compartment handling conveyed material. This construction is said to eliminate any metal to metal contact in the carrying run, preventing possibility of dirt or lubricant contaminating material.

Taylor Fulscope Controllers

To meet a need for higher quality of control in processing technique, the Taylor Instrument Companies, Rochester, N. Y., have introduced a redesigned line of new Fulscope air-operated recording and



New Taylor Fulscope Controller

indicating controllers for temperature, pressure, rate of flow, and liquid level. In addition to the convenience of combining in one instrument the conventional proportional response and automatic reset forms of control, the new Fulscope introduces a third process-control effect, Pre-Act, which is a supplementary control feature which makes control-valve connections according to the rate of control-point deviation. The Fulscope is available in five standard sizes.

Reflector With Steel Hood

Now furnished with a new hood of rolled steel construction, the Seprable Reflector, a development of the Goodrich Electric Company of Chicago, Ill., combines lightness with greater strength. The thinner wall provides additional wiring space, while deep, clean threads form a better ground connection. Greatest possible simplicity is obtained by its "come-apart" design, as it requires merely a quarter-turn to release or attach the reflector. To install, it is only necessary to attach the hood and wire the socket. The reflector finished in permanent porcelain enamel, may be snapped in place later. The fixture is fitted with a resilient socket which is removable and may be replaced at small cost. To absorb vibration and lengthen the life of the lamp, the socket is spring mounted.

Holophane "Cranelite" Illumination

Standard reflectors used on cranes employing various kinds of improvised shock absorbers soon have the lamp filament broken, it is claimed, by vibration and inertia or whip. To withstand severe service of under crane mounting and in ac-

For Extra Illumination Under Cranes

tual service on high speed cranes, the "Cranelite" has been introduced by Holophane Company, Inc., New York City. The unit is installed under the catwalk and is relamped by raising up a section of the catwalk floor, or it is mounted on the edge of the catwalk and is swung up for relamping by using an angle section for attachment to the catwalk. It is fastened to the crane by a steel plate 10 inches in diameter, ½-inch thick.

Wide-Vision Goggle

Offering a full 150-degree effective range of vision, the new and improved No. 220 Wide-Vision Goggle, a late development of the Chicago Eye Shield Company, Chicago, Ill., obtains what is tantamount to the widest practical amount of working vision through the medium of lens-embodying eye-protective devices. Hardened safety lenses provide maximum protection, it is declared, against severe impacts, and both lenses may be renewed easily by sliding them through the outer side of each eye-cup and inserting the new replacement. An important feature of the new Cesco 220 Wide-Vision Goggle is the one-piece moulded cushion pad composed of a very pliable material highly resistant

Cesco 220 Wide-Vision Goggle

to perspiration. These pads are said to conform to varying contours of practically every wearer, seating each eye-cup comfortably and snugly. The nose bridge is adjustable and ventilation holes in the rust-proofed metal portion of the eye-cups increase cool air circulation.

NEW YORK LIFE

INSURANCE COMPANY

A Mutual Company, Founded on April 12, 1845 . . . Incorporated under the Laws of the State of New York

THOMAS A. BUCKNER
Chairman of the Board

51 Madison Avenue, New York, N. Y.

ALFRED L. AIKEN
President

95th Annual Statement

A BRIEF DIGEST...DECEMBER 31, 1939

Paid to Policyholders and Beneficiaries in 1939 ..... **$210,625,618**
Increase of $9,130,681 *over* 1938

Total of such payments during the past ten years exceeded $2,180,000,000

Insurance in force, Dec. 31, 1939 ..... **$6,830,834,796**
Increase of $37,008,487 *over Dec.* 31, 1938

New Insurance in 1939 ..... **$427,756,600**
Increase of $4,939,100 *over* 1938

Surplus Funds reserved for General Contingencies, Dec. 31, 1939 ..... **$125,639,022**
Increase of $1,083,811 *over Dec.* 31, 1938

Voluntary Investment Reserve, Dec. 31, 1939 ..... **50,000,000**
Increase of $5,000,000 *over Dec.* 31, 1938

Total reserved for Contingencies **$175,639,022**

Dividends payable to Policyholders in 1940 ..... **$39,216,872**

The market value of all bonds on December 31, 1939 was $55,000,000 in excess of the value at which they are shown in the assets below.

ASSETS

Cash on Hand, or in Bank	$67,927,082.39
United States Government, direct, or fully guaranteed Bonds	701,727,225.08
State, County and Municipal Bonds	243,755,266.62
Canadian Bonds	81,887,383.00
Railroad, Public Utility, Industrial and other Bonds	615,596,078.35
Preferred and Guaranteed Stocks	86,064,795.00
Real Estate Owned (Including Home Office)	123,135,251.65
First Mortgage Loans on Real Estate (including $488,108.11 foreclosed liens subject to redemption)	450,586,021.57
Policy Loans	329,117,047.42
Interest and Rents due and accrued	29,323,995.01
Net Amount of Uncollected and Deferred Premiums	33,148,123.99
Other Assets	10,212.82
TOTAL	$2,762,278,482.90

LIABILITIES

Insurance and Annuity Reserves	$2,245,682,435.00
Present Value of Amounts not yet due on Supplementary Contracts	147,366,448.04
Dividends Left with the Company	118,930,277.31
Other Policy Liabilities	15,898,719.23
Premiums, Interest and Rents Prepaid	11,091,117.08
Miscellaneous Liabilities	3,505,635.85
Estimated Taxes	4,947,956.39
Dividends payable to Policyholders in 1940	39,216,872.00
Voluntary Investment Reserve	50,000,000.00
Surplus Funds reserved for General Contingencies	125,639,022.00
TOTAL	$2,762,278,482.90

Securities valued at $41,067,951.95 in the above statement are deposited with Governments, States and Trustees as required by law. Canadian currency Assets and Liabilities carried at par of exchange.

A more complete report containing a list of securities owned by the Company will gladly be sent upon request.

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Vice-Chairman, Inland Steel Co. Chairman, Joseph T. Ryerson & Son, Inc.

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President, R. H. Macy & Co., Inc.

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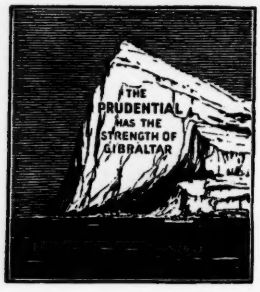
Your life insurance agent is more than a salesman of protection.

He is a trained specialist in his field; his advice and guidance are always available to you.

Take your problems to him. When you need and can afford additional protection let him measure your requirements and "fit" them to you, so that you may receive a maximum of coverage at lowest possible cost.

You will find him anxious to cooperate. The beneficiaries of your policy, perhaps you yourself if you survive, will be grateful for his concern at a future time when the dollars your insurance provides may be urgently needed.



The Prudential
Insurance Company of America
Home Office, NEWARK, N. J.

FINANCE » » » and « « « INDUSTRY

N. Y. Life Insurance Report

The annual report of the New York Life Insurance Co. for 1939, its 95th statement of the kind, shows increased assets of $114,800,000, total assets being $2,762,000,000.

Alfred L. Aiken, president of the company, says: "In valuing our assets at the close of the year, we have taken a realistic view of current conditions. All guaranteed and preferred stocks, and all bonds in default of interest or principal or considered to be not amply secured, are taken in the assets at market value. Bonds deemed to be eligible for amortization are taken at amortized values. If all bonds had been taken at market values, the company's assets, and likewise its surplus, would have been increased by $55,000,000."

The largest item in the assets is United States government bonds, direct or guaranteed. These amounted to more than one-fourth of the total and are over $700,000,000. This item increased almost $75,000,000 during the year. Mr. Aiken says: "Obligations of the United States government are still the largest source of supply of new high-grade investments."

The report shows in cash on hand or in bank $67,927,000, an increase of over $17,000,000 above the previous year. Public utility bonds at $298,900,000 increased by $28,000,000; Canadian bonds, $81,800,000, increased $17,000,000; industrial and other bonds, $49,600,000, increased $14,800,000. Policy loans totaled $329,000,000, a decrease of approximately $20,000,000.

During 1939 payments to living policyholders was $139,800,000, and beneficiaries of death benefits received $70,800,000. The total amount paid to policyholders and beneficiaries in the last ten years Mr. Aiken stated, is $2,180,000,000, and this sum represented thousands of individual payments, often at times of unusual financial need on the part of the recipients.

New insurance during 1939 amounted to $427,000,000, and total insurance in force under 2,872,234 policies totaled $6,830,834,796.

Benefit Fund Of Norfolk and Western

Benefits paid to the members of the Norfolk and Western Relief Fund and their families during the last quarter of 1939 amounted to $134,726.

The fund was established in 1917. Since that time benefits have been paid totaling $12,487,000. For the establishment and operation of the department, the entire cost of which the railroad bears, the Norfolk and Western has expended $2,705,000.

Expenditures By Electric Utilities

The Federal Power Commission reports that private electrical utilities plan to spend in 1940 a total of $490,000,000, and public organizations will spend $103,000,000.

The expected additional installed capacity will be 1,877,000 kilowatts, an increase of over 4 per cent above existing capacity.

Taxes

Complaints about taxes increase in number. Many small businesses are unable to bear the load. Taxation falls with particularly embarrassing effect upon modest enterprises as well as upon the individual who in the final analysis has to pay the greater part of the bill.

It is abundantly clear to everyone who thinks, as has been stated frequently in the MANUFACTURERS RECORD, that taxes must go higher if units of government are to pay what they

(*Continued on page* 46)

75 YEARS OF INDUSTRIAL EXPERIENCE

Ever since First and Merchants was organized 75 years ago, it has been an important bank for manufacturers. Many of its officers and directors have had exceptionally broad experience in industrial activities over a period of years.

Therefore, Virginia's largest and Richmond's oldest bank provides facilities of special value to industrial enterprises in the South.

FIRST AND MERCHANTS
National Bank of Richmond

John M. Miller, Jr., Chairman of the Board • H. Hiter Harris, President

CAPITAL AND SURPLUS SIX MILLION DOLLARS

Member Federal Deposit Insurance Corporation

We have helped

many businesses that have brought us their financial problems.

Correspondence invited.

BALTIMORE COMMERCIAL BANK

GWYNN CROWTHER, *President*

BALTIMORE, MARYLAND

Member Federal Reserve System
Member Federal Deposit Insurance Corporation

Pensacola Invites Industry

Pensacola has what industry wants—good port facilities, marine terminals for the L & N R.R. and the Frisco Lines, nearby raw materials, good labor and living conditions, low costs of operation. Investigate Pensacola. For further information write
B. F. Langford, Sec. Mgr., Municipal Advertising Board—

PENSACOLA FLORIDA *on the Gulf*

PLANT SITES
in the Seaboard Southeast

In the six southeastern states served by the Seaboard Air Line Railway there are many excellent plant locations suitable for a wide variety of enterprises.

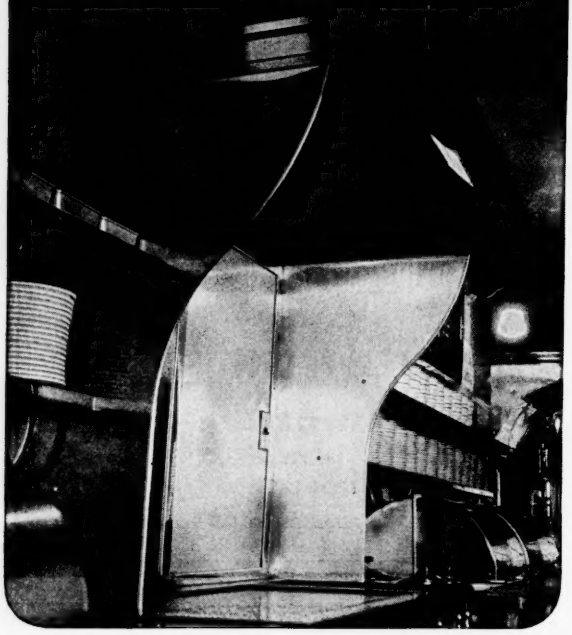
Assets of prime importance include an abundance of raw materials, cheap power, good labor conditions, excellent transportation facilities, quick access to markets, and last but not least, a friendly people who are sympathetic towards industry and its problems.

Detailed reports will be furnished on specific sites upon request. To interested prospects we offer all the benefits of an experienced plant location service without obligation or cost.

WARREN T. WHITE, GENERAL INDUSTRIAL AGENT
SEABOARD AIR LINE RAILWAY, NORFOLK, VA.

Industrial Department
SEABOARD
AIR LINE RAILWAY

"STAINLESS-WISE PEOPLE IN SOUTHERN TOWNS SAVE MONEY"



• A letter from a Florida correspondent says this: "Our stainless steel kitchen equipment and tableware have saved us a lot of money. Water in this section is high in sulphur content; and atmospheric conditions near the coast are severe. For one thing, before we bought stainless we had to replate our tableware every year . . . "

Both in homes and in industries ARMCO Stainless Steels help cut operating and maintenance costs to the bone. No matter what your business, it's likely that somewhere these glistening, durable metals can save money and earn money for you.

Remember, ARMCO Stainless is not limited to applications where light weight, cleanliness or surface beauty are important. Use it for tough jobs too, where great strength, high corrosion resistance, abrasion- and heat-resistance are needed.

Shall we talk it over—in terms of your requirements? Possibly the correct grade or grades of ARMCO Stainless Steels will be just the answer to a bothersome production or sales problem. Write to The American Rolling Mill Co., 1141 Curtis St., Middletown, Ohio. Offices in Key Cities.

ARMCO

STAINLESS STEELS

Finance *and* Industry

Taxes

(*Continued from page* 44)

owe, and the worst part of it is that in many instances the sums are increasing, particularly in the case of the federal government.

States now have their income taxes and our cities are planling a similar course. Hidden taxes, not apparent at once to the consumer, are on most articles he buys. While this goes on, and business as the source of most tax revenue waits for a turn in the tide, politicians are ladling out taxpayers' funds with what appears to be supreme abandon.

One result is the formation of Taxpayers' Associations in all parts of the country, a healthy sign.

Expenses of government, including the almost endless list of jobholders, the duplication of expense in cities and counties and states, are being scrutinized and representatives of the people are being asked to give an accounting of what appears to be wasteful extravagance. Most businesses depend upon revenue rather than economy. Lacking the former, the present is a good time to examine expense accounts.

Bank Deposits At Record

The report of the Federal Deposit Insurance Corporation for 1939 pointed out some interesting facts.

Bank deposits increased 13 per cent to an unprecedented total of $56,076,000,000 in 1939. This was the sum on deposit the last of the year in 13,535 insured banks.

Assets increased 11 per cent to $63,147,000,000, while loans and discounts were $16,866,000,000, or approximately 30 per cent of total bank deposits.

Holdings of government obligations increased seven per cent to $15,567,000,000.

Government Printing Costs

Senator Byrd called attention recently in an article in the MANUFACTURERS RECORD to the amount of money it would take, according to the estimate of the Public Printer, to print the report of the various lending agencies of government. There are 31 major lending agencies and 1476 subsidiary lending agencies.

The report took eight months to prepare and the figure given as necessary to print it was $43,000.

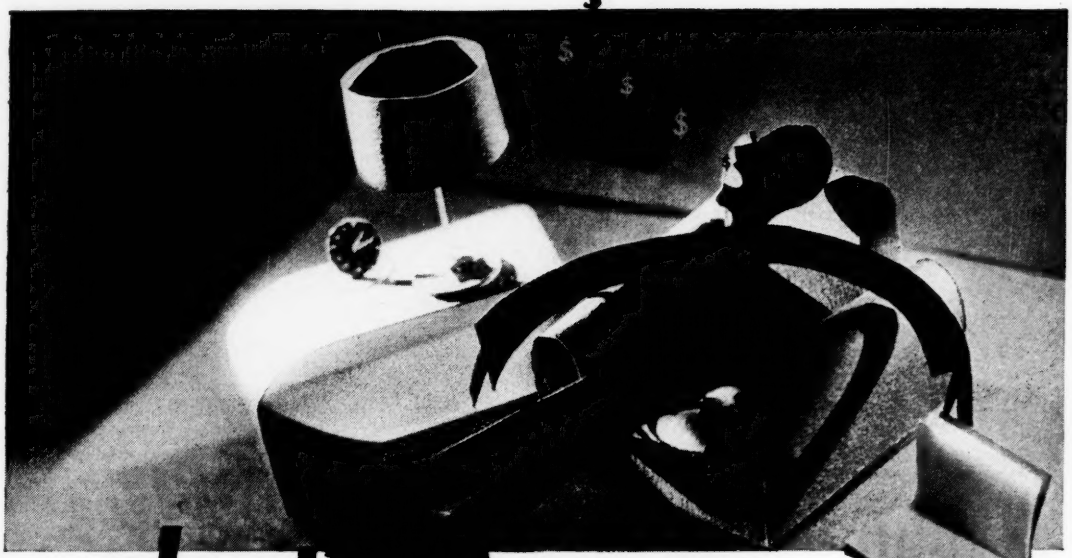
The United States Chamber of Commerce says it costs an average of $1200 to print the Labor Relations Board's record in cases so far taken to court, and that a volume a month is the present rate of production of the Board to accommodate its printed decisions.

A Way To Reduce Expense

Reams have been printed about the colossal debt load resting upon federal government as well as states and cities. The total is far beyond any previous record. A few weeks ago it was encouraging to note a tendency on the part of Congress to reduce expenditures and cut budget estimates. The attitude afforded encouragement to those who believed and have maintained that we have been following a course that if persisted in would bring disaster. At the same time it was recognized that this was an election year and there was a possibility Congress might change its mind, and might not be able to resist the appeals of those who have their hands out.

It appears as this is written that their cries have been heard, and the first cuts have been more than matched by later additions to the spending program. It has been hinted that a way to cut expense would be for the President to issue orders to the departments and bureaus to reduce their expenditures forthwith. He has the authority.

HOW YOUR SALE$ DOLLARS ARE



slept away

What we are about to say is of immediate concern to you—if you advertise and sell to business executives.

$ $ $ You put money into executive publications which are read at home. Your investment is sound and necessary. Executives see your messages; are interested, impressed, persuaded.

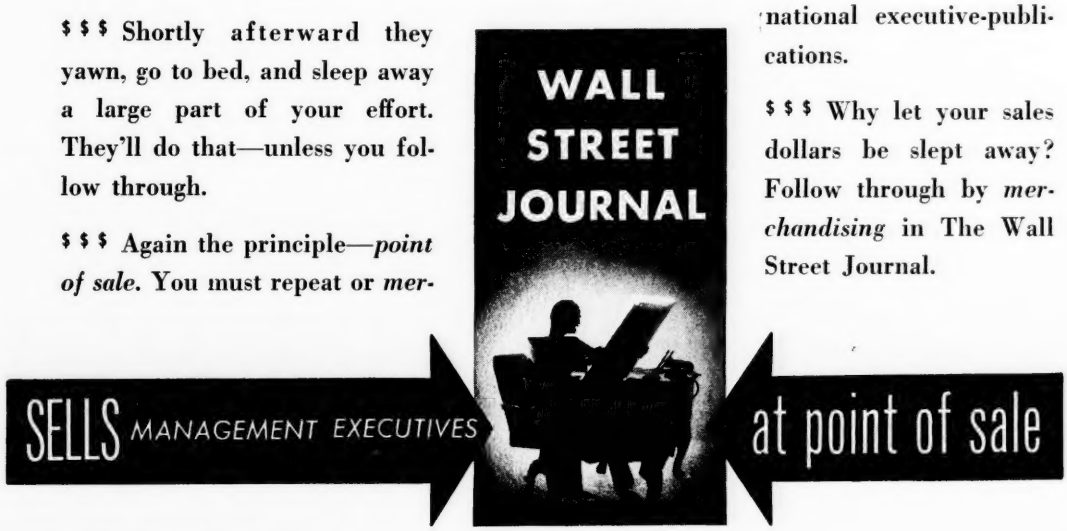
$ $ $ Shortly afterward they yawn, go to bed, and sleep away a large part of your effort. They'll do that—unless you follow through.

$ $ $ Again the principle—*point of sale*. You must repeat or *merchandise* your message in the executive's office on the two square yards of desk top where he buys.

$ $ $ Your one medium for that purpose is The Wall Street Journal. 86 per cent of its circulation is read by executives in their offices at their desks.

$ $ $ This compares with a high of 61 per cent to a low of 12 per cent for other national executive-publications.

$ $ $ Why let your sales dollars be slept away? Follow through by *merchandising* in The Wall Street Journal.

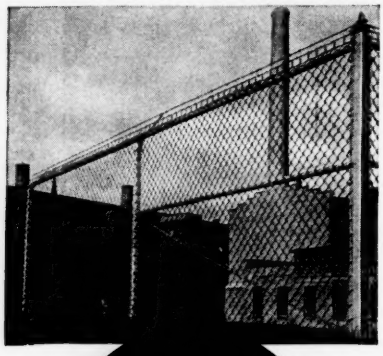


PROTECTION

FOR INDUSTRIAL PROPERTIES

Against

SABOTAGE, TRESPASSERS TROUBLE-MAKERS



ANCHOR FENCE

RESISTS FORCE, ALWAYS STAYS IN LINE, QUICKLY INSTALLED

Europe's war has brought an increase in sabotage, trouble-making and trespassing to industries here at home. Your plants and equipment are more than ever subject to malicious damage which might interrupt your production schedules, wipe out your profits. Experience in the last war proved that one certain form of protection is an Anchor Fence.

Far-seeing executives are today installing Anchor Fences to completely protect their plant—adding sections at strategic points where necessary—installing new fence to take care of plant expansions.

Anchor's Nation-Wide Erecting Service assures you immediate installation—and an Anchor Fence will quickly return its cost by preventing saboteurs or trouble-makers from halting profitable operations. Send for the Anchor Fence Engineer today. He will recommend the proper Anchor Fence installation for complete protection of your plant or mail the coupon now for free Industrial Fence Manual.

SUGGESTION—Since the War broke out, more orders have been placed for Anchor Fences than during any corresponding period for the last 10 years. Our production and Nation-Wide Erecting Service are still able to fill your orders promptly. We suggest, however, that you act quickly.

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☐ Please have Anchor Fence Engineer call.
☐ Send illustrated Industrial Fence Manual.

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Firm.....

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INDUSTRIAL NEWS

Ryerson Enlarges Detroit Plant

Continuing the Ryerson tradition of providing the finest in steel-service facilities, a new high-bay type span has been added to the Detroit plant of Joseph T. Ryerson & Son, Inc., of Chicago. The new span increases floor space by over 30,000 square feet, bringing the total floor area to approximately 250,000 square feet. In addition to housing part of the hot rolled steel stock, the new building will greatly increase facilities for Ryerson's complete reinforcing steel-service to contractors and builders.

Report to Revere Employees

Prepared in a simple and understandable manner, the annual statement to employees and stockholders of Revere Copper and Brass Incorporated, New York City, has been issued by President C. Donald Dallas. The report covers the year 1939 and shows how Revere got its money and how it was expended. Because of the general increase in the volume of business, wages of all employees working on an hourly basis were increased on September 18. Business continued on a high level during September, October, November and part of December, prices remaining firm. As a result, the company was able to finish the year with a profit of $1,615,068, as compared with a loss in 1938 of $2,125,407.

Metal Trades Association

The Forty-Second Annual Convention of the National Metal Trades Association will be held at the Biltmore Hotel, New York City, on May 21 and 22. Subjects to be discussed will deal with industrial relations problems. The National office of the Association is at 122 South Michigan Avenue, Chicago, and the eastern office at 60 East 42nd Street, New York. Homer D. Sayre is Commissioner of the organization and Harry S. Flynn, Secretary.

Chapman Represents Cochrane Corporation

Charles M. Chapman is now representing Cochrane Corporation, Philadelphia, Pa., on flow meters in the Cincinnati territory covering parts of Ohio, Indiana and Kentucky, according to announcement by the company. His office is in Room 715, Schmidt Building, Cincinnati.

Sell Link-Belt Stokers

Link-Belt Company, Stoker Division, Chicago, Ill., announces the appointment of the Georgia Power Company, Atlanta, Ga., as retail dealers for the sale of Link-Belt stokers in that territory. The merchandising department of the Georgia Power Company is under the direction of O. M. Jackson, recognized as one of the leading utility sales managers in the country. Engineering, installation and servicing will be handled by the Link-Belt stoker distributor in Atlanta, the Campbell Coal Company.

Falk Executive Changes

The Falk Corporation, Milwaukee, Wis., well known manufacturers of gears, couplings, marine drives, steel castings and other industrial products, announce the following changes in executive positions: Edward P. Connell, Treasurer, assumes the newly created position of General Manager, and Walter L. Schneider succeeds Matthew A. Carpenter as Sales Manager in charge of all Falk products except those covered by the Foundry Division. Mr. Carpenter, who is Secretary of The Falk Corporation, will continue in a supervisory capacity over the Sales, Sales Promotion, and Advertising departments.

United States Steel Subsidiaries at Coal Exposition

Six spaces will be used by United States Steel subsidiaries in a joint exhibit for displaying their products to mine owners and operators at the Seventeenth Annual Coal Exposition of the American Mining Congress to be held in Music Hall, Cincinnati, Ohio, April 29 to May 3. Four new steel room timbers developed by Carnegie-Illinois Steel Corporation, particularly adapted to use in large room operations, will be shown. These new steel timbers range from 16 to 20 feet in length and are designed for use with the customary wooden pit posts. The economy of Cor-Ten, the high tensile, corrosion-resistant steel will be featured, and copper steel Duroline pipe will be shown, as well as other tubular products of National Tube Company. Cooperating in this joint exhibit will be American Bridge Company, American Steel & Wire Company, Carnegie-Illinois Steel Corporation, Columbia Steel Company, National Tube Company, and Tennessee Coal, Iron & Railroad Company, all subsidiaries of United States Steel Corporation.

Charles Arthur White

Charles Arthur White, Secretary-Treasurer of Leeds & Northrup Company, Philadelphia, Pa., manufacturers of electrical measuring instruments, electric heat treating furnaces, etc., died at Germantown Hospital in Philadelphia on March 2. Born near Poughkeepsie, N. Y., fifty-eight years ago, Mr. White was associated with Adriance Platt & Company from 1902 to 1914, and from 1915 to 1920 was cost accountant, later purchasing agent, of the Hero Manufacturing Company of Philadelphia. He joined Leeds and Northrup Company as chief accountant in 1920 and was made Secretary-Treasurer by 1928. Active for many years in the work of the Presbyterian Church and in Y. M. C. A. activities, Mr. White was past president of the Rotary Club of Philadelphia.

David C. Jones

The Lunkenheimer Company, Cincinnati, Ohio, well known manufacturers of valves and other appliances, announce the death on March 11 of David C. Jones, vice president and general manager. Mr. Jones was born in Cincinnati on November 14, 1876, and entered the employ of The Lunkenheimer Company in 1894. He was prominently identified with Cincinnati banking and industrial activities and also had served as president of the American Supply and Machinery Manufacturers' Association.

H. P. Conway

The Grinnell Company, Inc., Providence, R. I., announces the death of H. P. Conway, vice president. For a number of years Mr. Conway was manager of the Grinnell office at Charlotte, N. C., leaving that position to take the vice presidency in Providence.

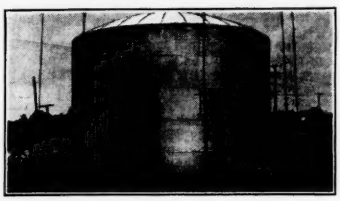
Pioneer Awards to Father and Son

The dinner of the Modern Pioneers recently held at the Belvedere Hotel in Baltimore was climaxed by awards of merit to father and son, Karl Turk, Sr., President of The Porcelain Enamel & Manufacturing Company, Baltimore, and a Fellow in the American Ceramic Society, and Richard H. Turk, Executive Vice President of the company and a member of the Board of Trustees of the Porcelain Enamel Institute. Scrolls presented to the Messrs. Turk contained the following inscription: "Modern pioneers on the frontier of American industry, in recognition of distinguished achievement in the field of science and invention which has advanced the American standard of living." The scrolls were signed by Karl T. Compton, Massachusetts Institute of Technology, who is chairman of the Committeee on Modern Pioneer Awards. Chester F. Hockley, chairman of the Maryland Committee of Modern Awards, made the awards, while Herbert Wagner, Chairman of the Board of the Consolidated Gas, Electric Light and Power Company of Baltimore, is president of the Maryland Academy of Sciences which sponsored the event jointly with the Regional Modern Pioneer Awards Committee of the National Association of Manufacturers. Charles R. Hook, President of American Rolling Mill Company, Middletown, Ohio, was the principal speaker.

Young Radiator Employee Service Record

Graphically presenting the service record of its 357 employees, the Young Radiator Company of Racine, Wis., prominent manufacturers of heating, cooling and air conditioning equipment, has issued a bulletin entitled "Time Moves on at Young's." The bulletin presents some impressive facts concerning the employment records of the company's group of workers, citing an average of five years' service for each present employee, effecting a total of 1768 years of employment. The Young Radiator Company was organized in 1927. F. M. Young is its president.

SOUTHLAND PRODUCTS
—WELDED OR RIVETED—



We now manufacture and offer to the trade tanks in all sizes for pressure or gravity work. Also other steel equipment of either

WELDED OR RIVETED CONSTRUCTION

This applies to field as well as shop built equipment.

Write us for information and quotations.

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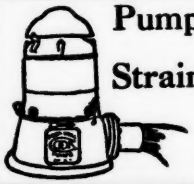

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Strainers—and other well supplies
WATER PRESSURE SYSTEMS
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Lawrenceburg, Indiana

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FOR
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CREOSOTED TIES, PILING, POLES, POSTS, CROSS ARMS, and LUMBER

WOLMANIZED LUMBER—
Decay and Termite Proof—Can Be Painted
Docks for Ocean Vessels

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Atlantic Creosoting Co., Inc.
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Plants at: New Orleans; Winnfield, La.; Louisville, Miss. Savannah, Ga.; Jackson, Tenn., and Norfolk, Va.

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are served by cypress tanks which last indefinitely, and we have been installing them throughout the South for over 50 years. Send us your inquiries for wood pipe. Ask for catalogue.

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Elevated Tanks	Bins
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General Steel Plate Construction designed for your requirements.

Lancaster Iron Works Inc.
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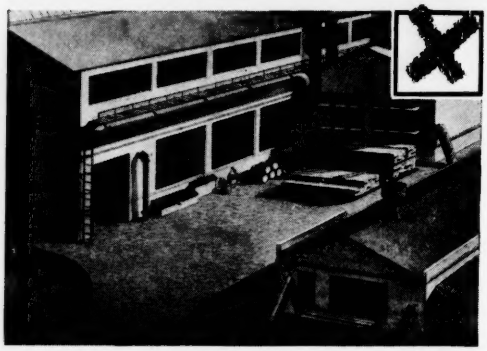
You can judge a firm by performance! Our experience in the field of elevated steel water tanks includes a complete line of tanks ranging from 5,000 to 2,000,000 gallon capacity.

We also manufacture tanks of other types for all purposes, as well as towers, standpipes, vats, boilers, etc. Let us know your needs in fabrication! WRITE FOR "TANK TALK" NO. 25-D.

Tank Builders For Over 80 Years!

R. D. COLE MANUFACTURING CO.
ESTABLISHED 1854
NEWNAN — GEORGIA

HOW DO BURGLARS RATE *YOUR* PLANT?

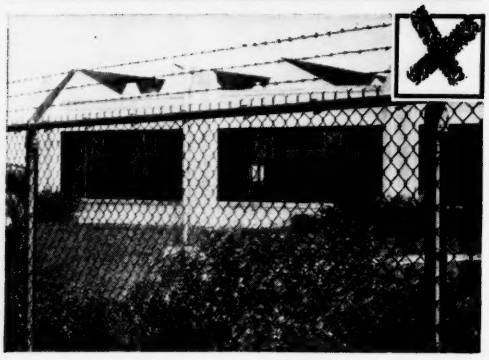


Easy!

Is your plant an easy mark, with little or no protection against burglars, marauders or firebugs? Do you really think a watchman can properly guard all parts of your plant? Isn't that leaving a lot to a man who can't possibly be everywhere at once?

Maybe!

Or does your plant protection depend on flimsy patched-up fence that commands the respect of no one? Passers-by, thieves, or your own workers—all can note the disregard for property which this represents. Easily torn apart, it affords little protection.



not a Chance

Burglars leave plants alone when they see this tough barrier. Breaking in is almost impossible—getaway is even more difficult and hazardous. This Cyclone protection is saving money for thousands of companies. Mail the coupon and get all the facts about this famous fence. And ask to have a Cyclone engineer call. There's no obligation. He'll tell you just what you need and furnish an estimate.

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Please mail me, without obligation, copy of "Your Fence—How to Choose It—How to Use It." I am interested in fencing: ☐ Industrial Property; ☐ Playground; ☐ Residence; ☐ Estate; ☐ School. Approximately.....feet.

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32-Page Book on Fence

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Standard Fence Company, Oakland, Calif., *Pacific Coast Division*
United States Steel Export Company, New York

UNITED STATES STEEL

TRADE LITERATURE

UNIT HEATERS—
Bulletin 140-A—illustrating and describing Modine Vertical Delivery Unit Heaters.
Modine Manufacturing Company, Racine, Wis.

FLOOR FINISH—
Folder — illustrating and describing COLORFLEX, a new floor finishing product which is penetrating and presents an enamel-like surface treatment for floors, preventing dusting of concrete and splintering of wood, while withstanding hard industrial traffic.
Flexrock Company, Philadelphia, Pa.

OIL FILM BEARING—
Booklet—devoted to the new Fast's Multiple Oil Film Bearing for which United States rights were obtained by Koppers Company last summer from Gustave Fast, the designing engineer who also denigned Fast's Coupling which Bartlett Hayward has manufactured for many years; booklet outlines history of bearings, discusses principle of Fast's bearing, illustrating and describing its design, and presents others facts.
Koppers Company, Bartlett Hayward Division, Baltimore, Md.

PUMPS—
Bulletin No. 142—"Pumps by Smith," illustrating and describing principles of design and construction of Smith pumps which are widely used for flood prevention, sewerage and similar services.
S. Morgan Smith Company, York, Pa.

BURKS WATER SYSTEMS—
Circular—illustrated, showing carload and truckload shipments of Burks water systems ordered by Burks jobbers during the mid-winter campaign, hundred of systems having been shipped in January, thus starting what, it is believed, will be Burks biggest year.
Decatur Pump Company, Decatur, Ill.

GYPSUM PARTITIONS, ETC.—
Booklet—"Gypsum Partition Tile and Fireproofing," illustrated, the first part covering partitions and the second fireproofing, the last five pages being devoted to specifications for gypsum fireproofing and for the erection of gypsum partition tile; detailed drawings are included to show the proper method of erection.
Gypsum Association, Chicago, Ill.

POTENTIOMETERS—
Catalog — "Type K Potentiometers and Accessories," 24 pages, illustrated, describing and listing the two Type K Potentiometers, K-1 and K-2, more particularly the latter because of its 3 ranges, convenient controls, strong coverings for all electric conducting parts and because it is standardizable without moving range switch or changing pentiometric setting; galvanometers and other accessories suited for use with these instruments are also described; added feature is an illustration and description of the Thermionic Amplifier which adapts poteniometers to measurements in high resistance circuits.
Leeds & Northrup Company, 4934 Stenton Avenue, Philadelphia, Pa.

COMPOSITE SHEATHING BOARD—
Folder—devoted to Z-RO-BORD Sheathing, a composite sheathing board constructed of fine seasoned lumber and a specially refined, tough asphalt, with qualities of insulation, strength, rigidity; it may be applied easily.
Z-Ro-Bord Manufacturing Co., Inc., Culpeper, Va.

PAINT PROGRESS—
Office Publication—presenting feature articles on "Paint Engineering Aids FSA Low Cost Farm Housing Projects," and "Study of 95 Flat Wall Paints Shows How to Evaluate Them."
The New Jersey Zinc Company, 160 Front Street, New York.

MOISTURE AND OIL SEPARATORS—
Bulletin, Publication 2950—8 pages, illustrating and describing baffle-type moisture and oil separators for use in vertical or horizontal steam, gas, and air lines; contains cross-section photographs and line drawings of 3 popular types of line separators built for use on lines ranging from ½ to 30 inches in diameter.
Cochrane Corporation, Philadelphia, Pa.

FINISH FOR PRODUCTS—
Booklet—"The Finish on Your Product," dealing with the importance of appropriate finishes; care required in the selection of finishes; types of finishes; describes manufacture and qualities of porcelain enamel, and its use for finishing various products; also presents a table showing the comparative performances of commercial finishes.
Ferro Enamel Corporation, Cleveland, Ohio.

(*Continued on page* 63)

Serving Baltimore's Tallest

Carey 85% MAGNESIA and Air Cell Asbestos

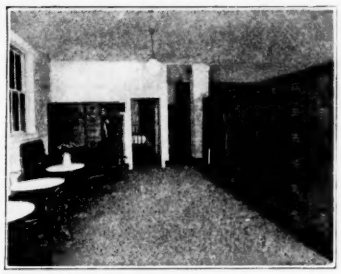
Baltimore's thirty-four story home of The Baltimore Trust Company has a business population of over 3,000 persons. Their heating and hot water comfort is safeguarded by Carey 85% Magnesia Insulation. The efficiency of the air conditioning system for the banking floors is maintained by use of Carey Air Cell Insulation.

CAREY experience, research facilities and a complete line of insulations are at your service for any building project. Write to Department 61 for information.

THE PHILIP CAREY COMPANY • Lockland, Cincinnati, Ohio
Dependable Products Since 1873
BRANCHES IN PRINCIPAL CITIES

DURABILT STEEL LOCKERS

Ideal for Women Employees clothing storage in



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COMBINATION LOCKERS

Combination coat and hat lockers (sometimes referred to as compartment lockers) provide unusually convenient service and are conserving of floor space. They are particularly desirable for railroad offices, department stores, telephone exchanges, or wherever women are employed. Each compartment and "box" locker is equipped with a lock that is mater-keyed. The key for each small hat compartment operates the lock on its corresponding coat compartment giving access to both by the use of one key. Write for prices and complete information.

"No better built than Durabilt!"

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Structural Assembly Shop, Navy Yard, Philadelphia, Pa. 49,000 sq. ft. White and 19,000 sq. ft. Actinic, Corrugated Wire Glass—side wall and monitor construction

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It *diffuses* light with a minimum of shadows. *It is practically* self-cleaning and can be used on a roof of any material and supply daylight in manufacturing and industrial plants—an important factor in all modern production.

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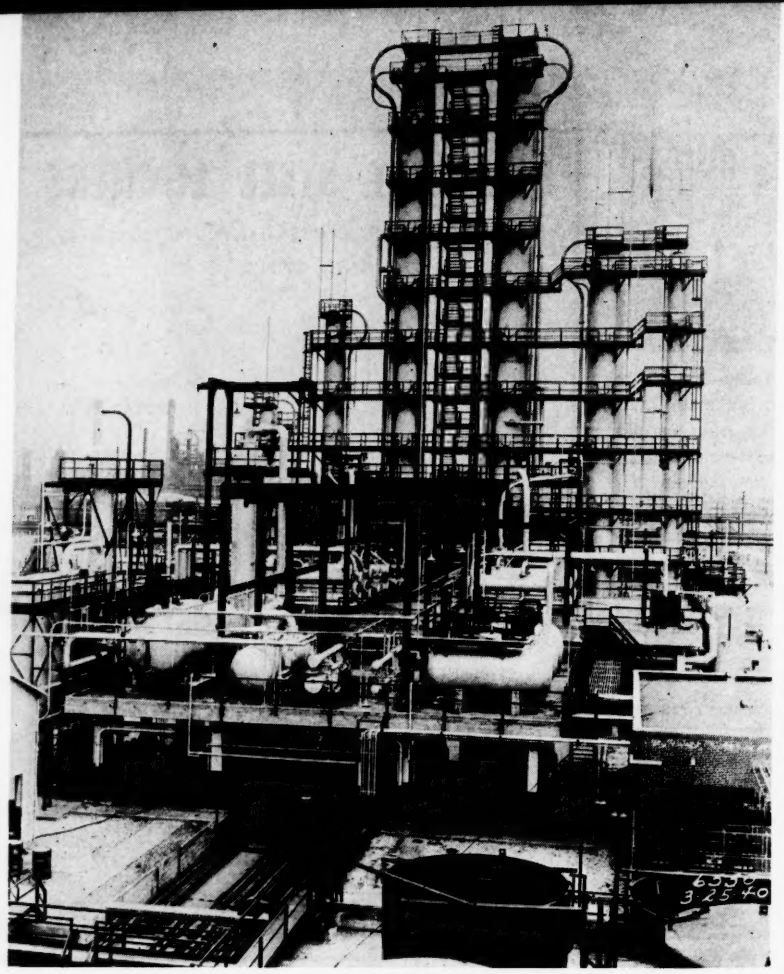

A new aviation gasoline unit at Gulf Oil Corporation's Port Arthur, Texas, refinery which will double the plant's output of premium gasoline.

United States Steel Report

THE United States Steel Corporation presented last month its 38th annual report in a different form from that previously used. Under ten headings there is given the whole operating history of the Corporation in 1939 in gross figures, in percentages, and as reduced to a per employee basis. On another page a tabulation gives the same items for each of the 38 years of the Corporation's life.

A clear picture is shown of all the money received by the Corporation since its organization from the sale of its products and services.

In giving the results for 1939 these facts stand out:

The Corporation had sales of $857,000,000 or $3,829 per employee.

It paid or set aside 36.2% or $310,000,000 for Goods and Services Purchased from Others, or $1,384 per employee; $61,000,000 or 7.1% for Wear and Usage of Facilities, or $274 per employee; $67,000,000, or 7.8% for Taxes, or $299 per employee; and $9,000,000 or 1.1% for Interest, or $42 per employee.

The Corporation paid 90% or $369,000,000 as Wages and Salaries for Men, leaving only $41,000,000 as Wages for the Use of Facilities.

In his review of the year, Mr. Edward R. Stettinius, Jr. Chairman of the Board said:

"The higher level of operations which prevailed during the year, compared with 1938, resulted in larger earnings, although not in proportion to those of 1936—a year of comparable tonnage. The lower relative earnings in 1939 were due to a number of factors, an important one being that a considerable part of the total tonnage consisted of products yielding lower prices. The increased tonnage failed to reduce unit cost sufficiently to offset the influence of the lower price yield.

"It has been the policy of the Corporation to lower prices (or to give a better product for the same price) and to increase wages as savings have come about through progress in manufacturing technique. But in the absence of corresponding price advances, costs over which the Corporation has no control have advanced faster than technical savings and improvements.

"Net income available for dividends on the capital stocks of the Corporation amounted to $41,119,934 in 1939, compared with a deficit in 1938 of $7,717,454.

"The earnings available for payment of interest and dividends, although a decided improvement over the previous year's results, do not represent from any viewpoint an adequate return upon investment; nor were the 1939 earnings sufficient to offset the 1938 deficit after payment of preferred dividends.

"In the latter part of the year the course of business was influenced by the outbreak of war in Europe. It seems appropriate to state that, quite aside from the question of humanitarian and moral issues, war orders represent only a fleeting prosperity and war business is certain to result in a disruptive shifting of our economy. War results in a destruction of capital that takes years to restore and of lives that can never be restored. The management of the United States Steel Corporation is convinced that the first requisite of the attainment of a lasting prosperity is peace and the prospect of enduring peace."

In referring to general conditions, the Chairman of the Board commented:

"During the year, in addition to increased demand for heavy goods, there was a continuation of the general trend toward lighter steels, thus further justifying the expenditures the management has made in recent years for new plants and facilities to meet this situation. With continued improvement in business we may expect further expansion in the demand for lighter steels. And with a renewed flow of capital the capacity of the Corporation to produce heavy steels may be even more rapidly utilized."

West Virginia

The State of West Virginia's advertisement appearing in this issue is one of a series calling attention to the remarkable resources of a state which is making notable industrial progress. It has a direct appeal to those who want news about the opportunities the South holds.

Coal of unsurpassed quality is found in 49 of West Virginia's 55 counties and its reserve is given as the vast sum of 150 billion tons. While coal is the basic industry, it is not by any means the sole mineral resource. Natural gas, petroleum, salt brine, clays and building stone, with other minerals, metallic and non-metallic, offer opportunity to the industrialist and the investor. Its acres of forest land cover more than half the State's entire area and 8,860,000 acres are listed as commercial forests.

The advertisement reads "Markets are Near Resource-full West Virginia," and the facts bear out the statement.

Marvel Joins National Tube

David T. Marvel, formerly manager of tube sales of Timken Steel and Tube Division of Timken Roller Bearing Company, Canton, Ohio, has joined National Tube Company's sales organization in the capacity of Assistant Manager of Sales, Elwood Sales Division, Elwood City, Pa.

Republic Steel Report

According to the annual report of Republic Steel Corporation, Cleveland, Ohio, for the fiscal year ended December 31, 1939, the company had a net profit of $10,671,343 after deduction of charges and expenses. Total sales of the company and its subsidiaries for the year amounted to $232,014,074. Net profit before deduction for Federal income taxes and small adjustment for minority interest was $13,135,011, and the provision for estimated Federal income taxes amounted to $2,450,000.

Bendix Has Record Year

Showing an all-time high in 1939 sales, payrolls and earnings, since the formation of the company in 1929, the annual report of the Bendix Aviation Corporation, South Bend, Ind., reveals that gross sales and revenues from all sources in 1939 totaled $41,726,547, an increase of 35 per cent over the previous year. Sales to the automotive industry increased 53 per cent over 1938, a subnormal year, while aviation product sales increased 27 per cent. Payrolls totaling $16,362,636 were paid to employees in fourteen communities, attaining the highest average annual earnings in the history of the corporation. Net consolidated income reported for 1939 amounted to $4,485,971, equal to $2.14 per share on 2,097,663 shares of outstanding common stock. This compared with 7 cents per share earned in 1938.

LONG LIFE TO LUMBER!

To add from 8 to 20 times the ordinary life and service you might expect from your lumber, use only pressure-preserved woods treated with ZMA or Creosote. Eppinger and Russell Co., has, for 62 years, been treating poles, ties, posts, piling, cross arms, cross ties and other timber for the nation's leading industrial firms and utilities. Safeguard your lumber against dry rot and termites by employing this outstanding wood-treating service.

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and
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WOOD PRESERVERS SINCE 1878
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BELMONT IRON WORKS
PHILADELPHIA NEW YORK EDDYSTONE

Southern Sales Offices, Charlotte, N. C.

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BUILDINGS AND BRIDGES
RIVETED-ARC WELDED

BELMONT INTERLOCKING
CHANNEL FLOOR

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Main Office—Philadelphia, Pa.
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PRESSED STEEL

Manufacturers using circular parts in their products, should have a copy of our "SHAPE BOOK" which describes standard shapes in pressed steel, we can furnish from dies on hand.

COPY ON REQUEST

THE COMMERCIAL SHEARING & STAMPING CO.
YOUNGSTOWN, OHIO

DESIGNERS AND ENGINEERS

Fabricators of:

Structural steel bridges, buildings, tanks, general plate work, barges, towboats, large cargo vessels, passenger vessels, tankers and refinery equipment.

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Address: Birmingham, Alabama

SAND—GRAVEL—BRICK
FILTER GRAVEL
Washed Sand and Gravel for Concrete
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CRUSHED STONE

Only highest grades of crushed
LIMESTONE AND GRANITE
Meeting all specifications

CAPACITY—8000 tons daily

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Boxley, Greensville County, Va.

W. W. BOXLEY & COMPANY
Boxley Building, ROANOKE, VA.

SHALE BRICK
Common, Face & *PAVERS*
***QUARRY TILE*-Floor Blocks**
Special Shapes from Hard Burned Shale
TO ORDER
Alcoa Brick & Tile Works, Alcoa, Tenn.

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Buildings and Memorials
NORTH CAROLINA GRANITE CORP.
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Producers and Manufacturers of
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WRITE FOR LITERATURE

Chemical Stoneware:
ALL TYPES CHEMICAL BRICK AND SHAPES.
SPIRAL, DIAPHRAGM, & RASCHIG RINGS.

Quarry Tile:
ALL TYPES QUARRY FLOOR AND WALL TILE.
ROOF TILE AND FACE BRICK.

PLANTS: DAISY, TENN; ADAIRSVILLE, GA.; NORWOOD & GULF, N. C.

OFFICES: ATLANTA, GA.; DAISY, TENN.; CHARLOTTE, N. C.

Movies Aid Modern Industry

(Continued from page 25)

made. It would have been possible to eliminate the man watching the depth gauge and do the entire job photographically if an additional camera had been trained on the gauge and all three cameras operated simultaneously at definite time intervals, by an automatic timing mechanism.

An experiment may be set up in the laboratory, or in the shop, or in the field, and by grouping all the various meters and gauges in close proximity and making a series of photographs with a motion picture camera at a definite, known rate, there is produced a permanent, coordinated record of the entire experiment.

The second group of picture frequencies is particularly interesting because it extends both above and below the normal camera speed. In a small way, studies in this field can be used either to compress or expand the time cycle. At the low speed end between one and approximately ten pictures per second, recording of various faster moving gauges or indicating devices can be made. An interesting example of this is a current attempt by large companies to study the distribution of stresses in certain extremely large metal structures. At a number of points on the structure, stress gauges of the dial indicator type are mounted. In front of each stress gauge is placed a camera, electrically driven, and set to take eight pictures per second with shutter angle giving an exposure of 1/100 second. As all cameras are coupled into the same line, it is possible to make simultaneous readings at all points in the structure during the test. Other uses which fall into this same group are the recording and analysis of relatively slow mechanisms that could be viewed normally, but when examined either on the screen or frame by frame from the film can be analyzed much more accurately.

Many of the problems that require picture frequqencies in this range can be solved satisfactorily with the standard 16 mm. cameras now available. Several of these offer variable speeds, usually from 8 up to 64 frames per second. One in particular, the Cine-Kodak Special, offers the added flexibility of shutter angle control, single frame, and the ability to couple to an electric motor drive. Additional timing equipment can also be attached to the Cine-Kodak Special, controlling the single frame operation in a fixed period between exposures of from four pictures per second to one picture in twenty-four hours. In addition to this camera, there is available a modification of a relatively simple standard motion picture camera to which an external electric motor drive is attached. Various speeds from 6 to 128 frames per second are obtained by changing the gear drive from a constant speed universal motor.

The last and perhaps the most interesting field of study is that of super slow-motion. Several types of equipment in this field are now available. One research laboratory has been using high-speed motion picture cameras for the last several years in development work on the rate of flame propagation in internal combustion engines. A glass port is built into the side of the cylinder wall. The camera is operated at speeds around 2,000 to 2,500 pictures per second. The record of one explosion is frequently all that can be obtained on a single strip of film, but many definite facts have been established and records obtained in this way. Another application of high speed motion pictures has been the work done by several railroads in cooperation with the Timken Roller Bearing Company. In the fall of 1938 a series of tests were run on the Burlington Railroad. A heavy platform approximately three feet square was supported ahead of the cylinder on each side of the locomotive. As the use of added artificial illumination was impracticable, the high-speed camera was placed on the bright side of the locomotive together with an electric motor driven camera operating at 100 frames per second and giving an exposure of 1/900 second. On the darker side another 100-frame camera was mounted. The cameras were driven by batteries in a baggage car directly behind the locomotive and were controlled from that car.

By means of grease on the track and relatively high starting speeds, it was possible to slip the main drivers up to speeds far in excess of those possible under normal conditions. Maximum slipping speeds of 128 miles per hour were obtained, and the motion pictures showed clearly that with certain conditions of balance at these speeds, the main driver rose off the rail approximately one inch. It should be understood that these exaggerated effects are not encountered in normal travel, but were created with test trains under special conditions, to obtain a clearer demonstration of the principles involved. Pictures of the test runs proved valuable by demonstrating a definite need for improved design of reciprocating parts, and leading to improved designs that effectively increase the safe speed of existing locomotive equipment.

Other uses of the super-speed camera are the study of high-speed relays and electric equipment, particularly in the communications industry. The plastics industry has found high-speed movies of value in studying the actual breakage of molded parts. And these are but random examples; indeed, the usefulness of motion pictures to industry is now limited, not so much by equipment and techniques, as by the fact that too few potential users are aware of the possibilities in this medium.

International Harvester's New Savings and Profit-Sharing Plan

(Continued from page 26)

ment for many years to do everything it could to reduce the hazards of unemployment. Also of great importance to the employe and the company is the problem of old-age security.

"The main objective of this plan, therefore, is to find a way to assist employes in providing retirement and unemployment income.

"Older employes will recall that the company for many years has been interested in the objectives of greater employe security. The first step toward that objective was taken in 1908, with the establishment of the International Harvester employe pension plan, under which more than 5,000 former employes have received pensions and other thousands will receive pensions in future years.

"Passage of the federal government's old-age pension plan made it necessary for us to revise our pension plan. As we studied the problems raised by those revisions, we became convinced that there was no single means of approaching the goal of employe security, and that a program embodying a two-fold approach to the problem would be most effective. That is what we have tried to do here, in providing for unemployment as well as old age.

"In the protection it offers against both unemployment and old age, the new plan supplements governmental plans."

The new savings and extra compensation plan rounds out a comprehensive program of company activities on behalf of employes. Among the more important features of this program are the pension plan, the vacation plan, and, under the Employes' Benefit Association, provisions for sickness, accident, and death benefits and hospitalization.

So far as practicable, the balances accumulating for each employe will be invested for his separate account in United States Savings Bonds. Any balances together with the company's matching credits will be jointly invested in United States and Canadian Government and similar securities, the payment of interest and capital of which is guaranteed by the United States or Canadian Government.

Any sum standing to the credit of an employe over 44 years of age and having been with the company ten years or more may be invested in a retirement annuity contract with convertible cash provisions.

NEW Sewer and Culvert Construction

By making concrete pipe on the job with Quinn Forms you give more men more work, can use less experienced labor and produce uniform concrete pipe of highest quality. Recognized standard of all concrete pipe.

QUINN PIPE FORMS

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The Largest Steel Fabricators in the Carolinas

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Structural Steel for all Industrial Structures, Buildings and Bridges.

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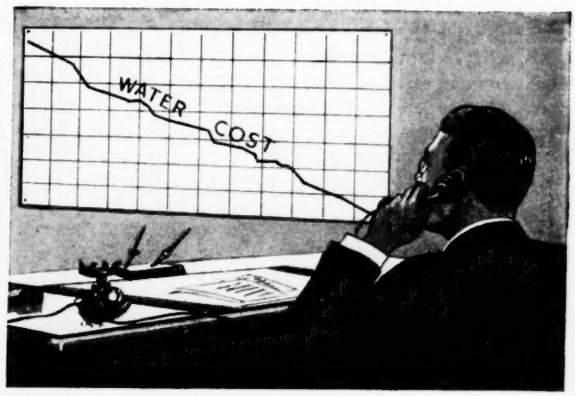
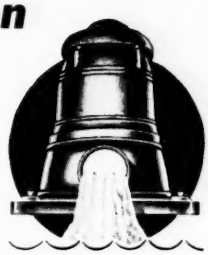


YOUR WATER COST

Can Be a Burden or a Bargain



Old out of date low efficiency wells and pumps place a costly burden on your operation figures. In times like these, it is good business to "plug" every useless expense at the earliest possible moment.

Check back over your water production cost for the past few years. Unless your figures are exceeding low, you are operating under a profit robbing cost burden.

The newest design Layne Wells and Pumps produce water at a new low figure—thus giving a decided bargain in water cost. Your present system can be modernized, stepped up in quantity of production and stepped down in cost per thousand gallons. Hundreds of cases are on record where Layne Wells and Pumps are saving big sums each year for their owners.

Any City, Factory, Paper Mill, Oil Industry, Railroad, Irrigation, or other business official, may secure a complete file of bulletins, catalogs and folders on Layne Well Water Systems, without obligation, by addressing,

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LAYNE

PUMPS & WELL WATER SYSTEMS

For Municipalities, Industries, Railroads, Mines and Irrigation

The Story of Vinyon

(*Continued from page* 29)

elongation and elasticity—all these vital characteristics depend on close control of temperature, pressure and speed. These three factors must be checked to the most minute fractional points.

Data on Vinyon Yarns

With respect to uniformity, the same denier tolerances are observed in the field of Vinyon yarn as in the field of rayon yarns. At present, the new yarn is available only in the bright yarn; however, it can be dulled by pigmentation. While present plans do not include the production of spun dyed Vinyon fiber, there are no technical obstacles to such production. Present plans do not include throwing the yarn. Some inquiries have been received relative to packaging the new yarn. Answering these, at present a medium-size package is offered: knotless 11-ounce spools and parallel tubes and 2 lb. cones from the same weight supply unit.

The Dyeing of Vinyon

Progress has been made with regard to dyeing. At present, one manufacturer of dyestuffs is prepared to dye samples of Vinyon yarn and fabric, in a wide range of colors, for approval, following up with demonstrations to permit work on a commercial scale.

The Vinyon division of the Meadville plant is a scene of intensive activity these days. On the technical side, work is going forward rapidly toward determining what new uses may prove suitable for the fiber. On the production side, attention concentrates on meeting immediate delivery requirements. Market interest and demand has materially increased since the announcement in early January of prices on Vinyon yarn and staple.

Uses and Applications

Undoubtedly, the most significant part of the story of Vinyon fiber with respect to its uses, will unfold gradually through the months to come. As a first step in development, the new textile is already going into an important group of industrial fabrics, including filter cloth, where its unusually high resistance to mold and mildew and attack by mineral acids, caustics and alkalis has gained ready acceptance for it. Other fields in which it is now being used are press felts, sewing threads and twines of various constructions. It is expected that the current year will find the fiber winning acceptance in various apparel and other textile fields. A few of the important possibilities in this direction are: bathing suits, shoe fabrics, glass curtains, upholstery, a variety of braided and knit goods, fish lines, nets, electrical insulation, chemical-resistant clothing, shower curtains, sail-cloth, awnings, and fusible shape-retaining fabrics. Laboratory work toward development of a Vinyon yarn for full-fashioned hosiery is now proceeding.

The story of Vinyon fiber, up-to-date, would not be complete without reference to one aspect of broad policy which is emphasized by the producers in all plans for the new yarn; namely, that a program of thorough experimentation is being adhered to, to be sure that the new textile shall be used only under those conditions which may be warranted by its special characteristics and qualities.

Crude and Synthetic Rubber

(*Continued from page* 28)

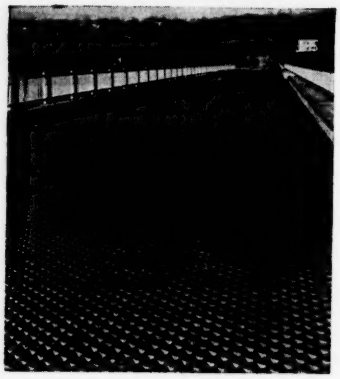
war last fall were unusually low. Actually, the 133,000 tons available last October compared with 259,000 tons at the corresponding time of 1938, was a supply only sufficient for about 2½ months. Ordinarily, such a situation might have given rise to some concern but it so happened that at the time there were 101,000 tons in transit to the United States. Furthermore, in anticipation of some countries, particularly Germany, importing less rubber than they did previously, it is expected that the International Committee will make increased allotments for an adequate supply to this country.

Meanwhile, a source of comfort to American manufacturers may well exist in the 85,000 tons of rubber agreed to by the United States government in exchange for 600,000 bales of cotton sent to the British Government. Of course, the principle of the exchange was to permit the two governments to acquire emergency reserves of these commodities and it was specifically agreed not to dispose of the material for seven years except in the case of a major war emergency. Just what constitutes a major war emergency to release these stocks might be questionable, but a provision of the agreement allows for release of the material as necessary to prevent deterioration so long as it is replaced by new rubber (or cotton). In this way the stock is undoubtedly an emergency supply for rubber goods manufacturers in this country. At the time of this writing about two-thirds of the time has elapsed during which this exchange was stated to be carried out so it may be presumed that a shortage of crude rubber in this country has been passed at least until we may more favorably review the possibilities of an adequate domestic supply from synthetic rubber based on southern petroleum.

Rakemann With Industrial Engineering

The Industrial Engineering Company, 50 Church Street, New York City, announces the appointment of Fred B. Rakemann as engineer in charge of sales and as advertising manager. Mr. Rakemann was formerly connected with the Utility Management Corporation of New York, N. Y.

NOT A PENNY
for MAINTENANCE



Cairo Approach Catskill, N. Y. — *N. Y. State Hy. Dept. Engineers*

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All types of Industrial Floors and Safety Steps.

Agents in all principal cities.

Write for special technical data

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Sales-Building
"Tool"

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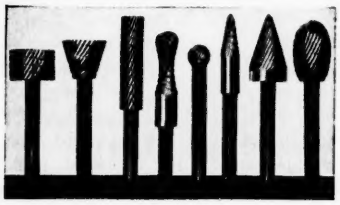

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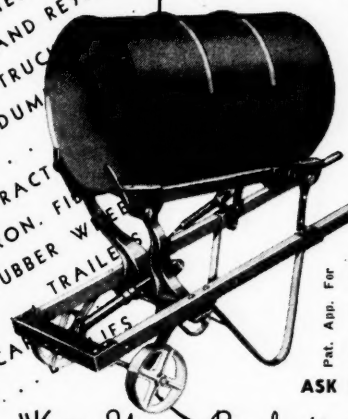
NEW Combination Barrel Truck and Automatic Lifter

The new Bulldog Barrel Lift Truck is a combination truck with *automatic lifter*, for trucking and draining all kinds of barrels and drums. Easily handled by one man. Speedy and efficient. Hydraulic pump lifts truck 28 inches — in a few seconds — ready for draining.



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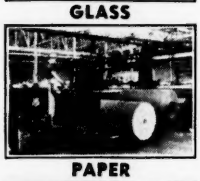

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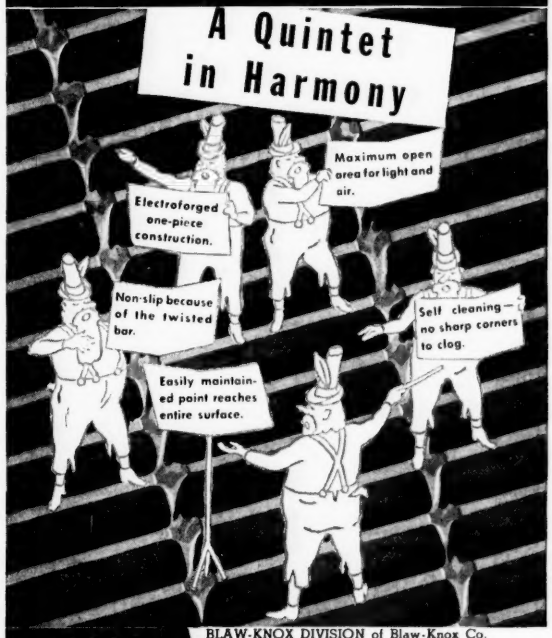
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The Free Enterprise System in America

(*Continued from page* 27)

critical attacks, whether emanating from government or from business. Further, he was brutally frank in informing the cabinet officer that the chief reason why business lacked confidence in government was that many business men firmly and sincerely believed that certain government policies, if persisted in, would wreck the entire national economy. Therefore, as patriotic citizens, anxious to promote the welfare of the nation, as well as their own enlightened self-interest, they could not lend support to those policies.

What is needed at this stage, as I see it, is genuine, sincere understanding between government and business. Gestures in that direction have been made from time to time and business has begun to breathe a little easier, only to find attacks coming from some new governmental quarter. Confidence is thereby destroyed and business recovery delayed. If a spirit of good will and mutual sympathy can be developed between men in government and men in business—who after all are only human beings—there is virtually no end to the accomplishments that private enterprise in America can achieve.

Of late there have been evidences of a more reasonable attitude toward business on the part of government. It is earnestly to be hoped that this friendly feeling will grow and expand. Certainly it is high time for government to bury the hatchet, forget past differences and begin to pull together with business. Such action will bring renewed hope and promise to the nation and its people. Business is ready to do its part.

We have the people and the resources, the plant and equipment, the inventive genius, and the will to do. All we really need is a clear and unmistakable signal to go ahead. From every previous depression—and there have been many—we emerged to go forward to greater achievement. Wider horizons beckon us today. Let us press onward in national unity.

Improved Resin-Bonded Wood Structures

(*Continued from page* 33)

large sum of money was spent in collaboration with his staff to produce these fuselages.

The glue used was blood albumen and the plan was to make very large sheets, boil them until the wood was very soft, and then with grippers, or so-called follower-rings, pull this shape over the forms or dies. The dies, being heated, would cause evaporation of the water in the wood. These fuselages were successfully produced and sample planes built.

The same principle was applied in making pontoons for the Navy and the original Admiral Byrd planes that flew the Atlantic had very large struts produced in that way.

Upon the cessation of hostilities, the Curtiss Company designed the Curtiss Oriole using this same principle in the production of its fuselage.

As previously stated, the blood albumen glue, while fully waterproof, was not termite-proof and as a result there was complaint against the plywood. During the '20s, however, research continued for a foolproof glue and phenolic resin proved the answer.

With the advent of plastics as a glue, interest was revived, particularly by Colonel Clark, and in collaboration with Sherman Fairchild, a plane was designed wherein an entirely new principle of formed plywood was employed. The veneers, not having been abused by boiling, lent themselves readily to heavy surface impregnation with plastic finishes and thus a virtually fireproof structure with an almost glass-like surface was attained. This product was called Duramold. Its use makes for mass production and answers the problem of light weight and by elimination of exposed rivets makes for a speedier plane.

(*Continued on page* 60)

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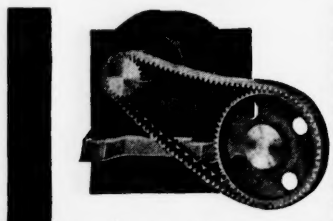
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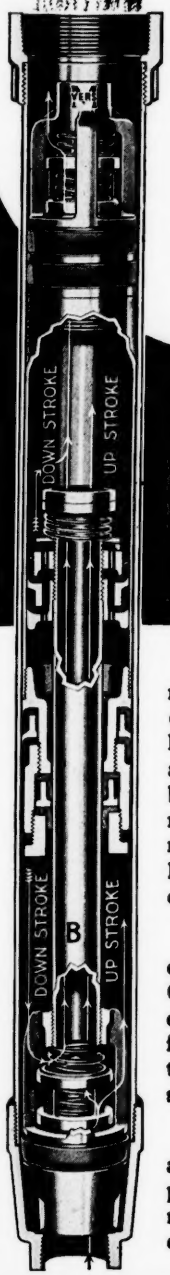

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Improved Resin-Bonded Wood Structures

(*Continued from page* 58)

It is obvious that Duramold is not limited to the aeronautical field. It is practicable to make innumerable highly desirable products. In the building field one-piece door-moulding will find extensive application. Naturally, window mouldings, wood gutter-spouts, and other items used in the construction of a building are practicable.

A formed piece of plywood several inches thick is perfectly practical to form a large lifeboat in one piece. This lifeboat could be designed to be much lighter-weight and at the same time stronger than present boats.

In view of the fact that Duramold is not limited to any thickness, it being perfectly practical to make panels of 3-ply construction in a thickness not over 1/48" and forming same, there is virtually no limitation. All this can be produced with the same type of machinery.

There are many articles now produced out of wood that if produced by the Duramold method, greatly improved designs could be made that are not now possible, and also possibly at a greatly reduced cost.

In a general way, I have demonstrated that plastic finishes broaden the base of a number of industries. Certainly that is true of wood. But I hope I have shown that it offers the foundation or reason for amalgamating other products with wood, wood being generally recognized as about the strongest thing in nature for its weight and therefore is a sort of keystone of a structural arch.

In closing, I want to make an appeal to all other industries, no matter what their nature or their base, to recognize the good, the valuable physical properties, the enduring nature, of other materials with which they compete. I am firmly convinced that mankind to progress must be mentally honest, with the underlying theory that the public is entitled to the best in basic materials, whether those basic materials stand alone or whether in combination with other materials; that a friendly feeling between competing materials may be the theme of many a technical article in the future, all directed towards the aim of offering to the public the best products, by willing recognition of all industries and appreciation of the fundamental reason for being of those materials. It is the true basis of science, it is the true basis of industrial tolerance, and it is the true basis that any inventor must approach towards an invention. Inventors must be free from bias or they are stymied before they start. Probity must be the guiding star of their career or they will achieve nothing of lasting benefit to mankind. Industry as a whole should be equally mentally honest in the consideration of competitive materials, and they should be very, very thankful that a basic product in the form of glue is available that makes possible a combination that will achieve this highly desirable result. I want to leave the thought that the youth of America is entitled to that sort of a heritage from us.

Purchasing Agents to Meet

The National Association of Purchasing Agents will hold their 25th International Convention June 3-6 at the Netherland Plaza Hotel, Cincinnati, Ohio. This meeting will celebrate the silver anniversary of the Association which announces the highest membership in its history of 5,500 purchasing executives from every line of industry.

An industrial exposition will be held in conjunction with the meeting, and it is expected that a wide variety of products and processes will be exhibited. The list of major firms expecting to have their products on exhibition, to the number of 75, represents a cross section of leading industrial enterprises.

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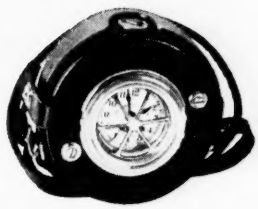

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Paper Exports Highest In Ten Years

United States exports of paper, paper manufactures and paper base stocks during 1939 were valued at $40,449,194, and were second only to 1929 in the value of shipments during the past 15 years, according to the Forest Products Division of the Commerce Department.

Exports of paper and its manufactures during December 1939, amounting in value to $3,991,476, were the highest in any month since February 1921.

The increase was in part traceable to trade diversion by South American countries, a trend in evidence during the latter part of 1939.

Total imports into the United States of paper and its manufactures for 1939, aggregating $126,793,442, were 12 per cent higher than in 1938. This increase is attributable chiefly to increased imports of newsprint paper, imports of which constituted 90 per cent of the total value of all paper imported into this country.

Preliminary figures on total imports of wood pulp during 1939 indicate a 17.6 per cent increase over imports during 1938, with a 1939 aggregate of 2,026,209 tons.

Of 31 items on the paper and its manufactures export schedule, only 6 failed to show an increase in 1939 over 1938. Exports of writing paper, amounting to 37,972,103 pounds valued at $2,521,919 were the most valuable paper export, followed by greaseproof and waterproof papers and wrapping paper except kraft a close third.

Contributing to the large export of paper in 1939 were shipments of newsprint paper exports which increased 139 per cent in volume over 1938; uncoated book paper, 67.7 per cent; overissue and old newspaper exports, 19.8 per cent; surface coated papers, 75.3 per cent; paper towels and napkins, 45.4 per cent; boxboard exports, 36.5 per cent; wallboard of paper or pulp, 103.6 per cent; blotting paper, 51.3 per cent; writing paper, 39 per cent; and miscellaneous group, 25 per cent.

A rise in the imports of newsprint paper was responsible mainly for the

(*Continued on page* 63)

■ Patent Attorneys

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Samuel Tierney, Westfield, N. J.

Paper Exports

(*Continued from page* 62)

general increase in all paper imports in 1939. Imports increased approximately 15 per cent by volume in 1939 as compared with 1938. Largest percentage increase by volume was registered in the imports of wrapping paper except kraft, a rise of 179 per cent in 1939 as compared with 1938.

Despite the outbreak of war in Europe, imports of wood pulp during 1939 were 17 per cent higher than in 1938, with particularly heavy imports arriving in the final three months of the year. Imports of mechanical wood pulp, chiefly from Canada, were up 30 per cent over 1938, and amounted to 227,954 tons. Imports of unbleached sulphite pulp, most of which comes from Sweden showed a 3 per cent decline as compared with 1938, and amounted to 661,090 tons. Bleached sulphite pulp imports, chiefly from Canada, amounted to 473,863 tons, or 40 per cent more than in 1938. Kraft pulp imports, mainly from Sweden, totaling 546,398 tons were 28 per cent higher than in 1938.

Trade Literature

(*Continued from page* 50)

ABRASIVE SERVICE—
Folder—illustrated, the latest mailing piece in the current campaign on "Norton Service," featuring the company's consulting engineering service.
Norton Company, Worcester, Mass.

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Logan Engineering Company, Chicago, Ill.

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Phelps Dodge Refining Corporation, 40 Wall Street, New York City.

SPRAY PAINTING—
Handbook—"ABC of Spray Painting Equipment," describing the functions of spray painting equipment in five parts as follows: The Paint Spray Gun, Its Troubles, Remedies and Accessories; Material Containers; Hose and Hose Connections; Air Transformers and Condensers, and Air Compressing Outfits.
The DeVilbiss Company, Toledo, Ohio.

WELDING ELECTRODES—
Booklet—24 pages, illustrating and describing Wilson Arc Welding Electrodes; prepared as a useful guide in helping to make quick, sure selections of proper electrodes for all classifications of welding work; reviews the general description, application, procedure for use, and physical properties of Wilson Electrodes, etc.
Wilson Welder and Metals Co., Inc., 60 East 42nd Street, New York City.

FARM BUILDINGS—
Booklet—"Better Farm Buildings with Pre-Cut Southern Pine," pointing out the advantages of Southern pine lumber for the construction of farm buildings and showing plans based on designs developed by leading agricultural extension universities with the United States Department of Agriculture.
Southern Pine Association, New Orleans, La.

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SPADERS AND TRENCH DIGGERS—
Bulletin 87-K—in two colors, illustrating and describing Sullivan spaders and trench diggers.
Sullivan Machinery Company, Michigan City, Ind.

LEATHER BELTING—
Catalog—condensed publication on leather belting for modern group drives, individual machine drives, etc., declared to be more economical and more efficient than any type of belt drive—either short or long centers.
Chicago Belting Company, Chicago, Ill.

Pit and Quarry Handbook and Directory— Published by Pit and Quarry Publications, 538 South Clark Street, Chicago, Ill.; 828 pages, 8½ by 11½ inches, cloth. Price $10.00.
This is the thirty-third edition of this combination reference book and directory of sand, gravel, crushed stone, cement, lime and gypsum plants. Reference text is made up of 32 chapters and covers, in revised form to conform with 1940 knowledge and practice, prospecting, plant design and departmental operation of various types of plants which produce the non-metallic minerals of construction and commerce. Arranged alphabetically by companies and geographically by plants, the directory section lists aproximately 6,500 plants and 15,000 individuals, many new names having been added while previous lists have been revised.

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Two Story Brick Building; 50,000 square feet floor space with power plant consisting of Leffel water wheel type Z direct connected to Electric Machine Co. generator 500 K.V.A. 600 Volts 3 Phase 60 Cycle, water coming from Municipal Canal at rate $11.00 per H.P. per year. All year round climate. Excellent transportation and labor conditions. An ideal manufacturing site. Address
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Augusta, Ga.

For Sale: Building and Site
One story building about 40,000 square feet and over four and a half acres in city limits; sprinkler system; cheap insurance; private track and located between two railroads.
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Saw Mill Business
FOR SALE
At Summerville, S. C. convenient to Santee-Cooper development. Going Saw Mill business with dry kiln, planers, moulders, etc. Modern residence. Commissary. City water and electricity.
Box 525, Summerville, S. C.

SUB STATIONS

550 KW Burke 250 v. 2300/3/60 M.G. Syn.
200 KW Westg. 250 v. 2300/4000/3/60 Rotary.
200 KW Westg. 250 v. 2300/3/60 M.G. Syn.
150 KW Westg. 250 v 2300/4000/3/60 M.G. Syn.
100 KW Ridge 250 v. 2200/3/60 M.G. Syn.
75 KW Westg. 250 v. 2300/3/60 M.G.
50 KW Allis Chal. 250 v. 220/440/3/60 M.G.
125 KW Cr. Wh. 250 v. 220/440/3/60 M.G.
200 KW West. 550 v. 2200/3/60 M.G. syn.
1—67½ KW Allis-Chal. 250 v. 220/440/3/60 M.G.

ENGINE GENERATOR SETS

300 KW. G.E. 3/60 Skinner Uniflow.
125 KVA Allis Chal. 220/440 Turbo.

COMPRESSORS

578 CFM 10-15x12 Chicago 60# steam.
485 CFM 14x10 I.R. 60# pres. elec.
255 CFM 14x9 Bury 2 stage elec.

TRANSFORMERS

3—333 KVA Pgh. 2300-115/230 1/60.
1—100 KVA West. 6600-220/110 1/60.
3—37½ KVA West. 22000-2200 1/60.
3— 50 kva. Pgh. 2300/220-440/1/60

SLIPRING MOTORS

1—100 HP. West. 220/3/60 1750.
4—700 HP. G.E. 2300/3/60 393 rpm.
4—500 HP. G.E. 2300/3/60 450 rpm.
1—400 HP. West. 440/220/3/60 1170 rpm.
2—300 HP. W. 2200/3/60 580 rpm.
1—250 HP. West. 440/220/3/60 690 rpm.
1—206 HP. West. 2200/3/60 580 rpm.
1—200 HP. West. 2200/3/60 690 rpm.
2—150 HP. West. 440/220/3/60 690 rpm.
1—100 HP. West. 440/220/3/60 700 rpm.
1—100 HP. West. 440/220/3/60-600 rpm.
1—100 HP. G.E. 220/3/60 600 rpm.
1— 75 HP. Westg. 220/3/60 850 rpm.
2— 75 HP. G.E. 440/220/3/60 900 rpm.
2— 50 HP. G.E. 440/220/3/60 1160 rpm.
2— 50 HP. Al. 220/3/60 900 rpm.

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Pittsburgh, Pa.

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375 KVA Generator Set

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1—188 CFM Penna. Class 3A, 9" x 8".
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